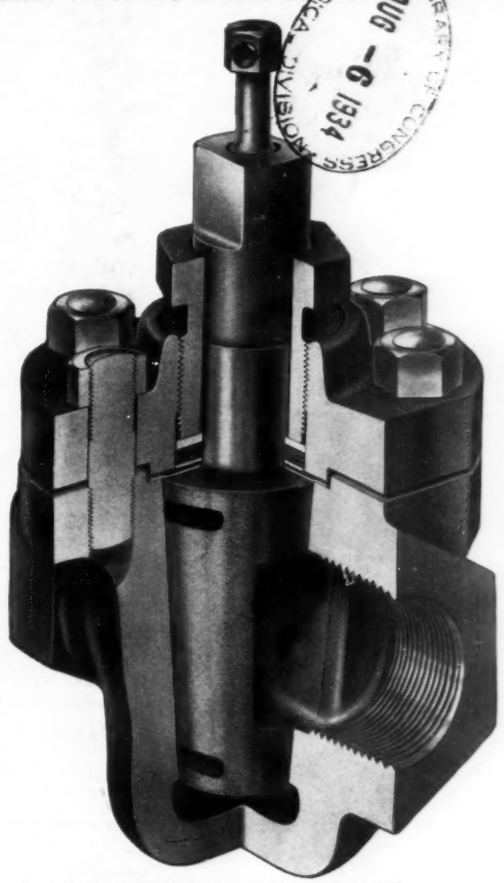
WESTERN GAS

"NORDSTROM VALVES $588 save us 588 per valve"

(MANY TIMES THE INITIAL COST OF EACH VALVE)

A well known Operator reports, "We have obtained exceptionally good service from Nordstrom Lubricated Plug Valves. Ordinary valve repairs in the same service would have amounted to approximately $168.00 per year per valve, or $588.00 per valve for three and one-half years."



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"Sealdport" lubrication. • Hydraulic pressure of the lubricant not exposed to line, regardless of position of plug. • Full-floating plug. • Quarter-turn to open or close. • Gate valve face-to-face dimensions (Emco-Nordstrom type).

. . . Change from ordinary valves TO EMCO NORDSTROMS and SAVE the difference

The above report is representative of countless instances where Nordstroms save their initial cost many times. Thus they are cheaper in service. When you figure ordinary valve costs for monthly repairs at one dollar per inch per valve (as do many companies), you realize the surprising saving effected by using Nordstroms. The initial price of Nordstroms is of little concern. It's the ECONOMY in service that counts—yet, the new Emco-Nordstrom Valves—with gate valve face-to-face dimensions—are competitive in price, service considered. Change—and save the difference! Ask for Bulletin V102.

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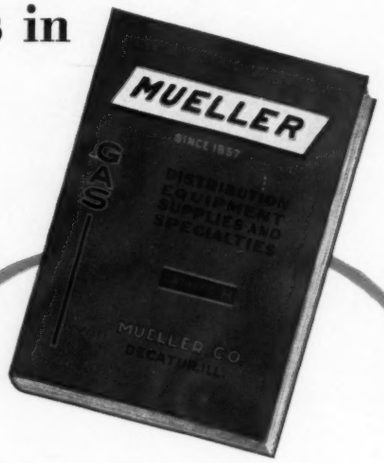
Stop *between pages 13 to 61 of your MUELLER catalog*

—and consider the improvements in *MUELLER* Tapping Machines



WHEN we talk to users of Mueller Drilling and Tapping Machines about the improvements that we have made in recent years, it is not at all uncommon for them to tell us that the machines they have handle the jobs satisfactorily and "do not need improvement!"

Perhaps that is the penalty we must pay for building lasting quality into Mueller equipment—*but*—

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Every ounce of brass that goes into Mueller Brass Goods is under laboratory control. It is strictly held to a copper content of 85%, and every physical quality of every run is laboratory tested. This is only one of many reasons why you should use only Mueller Stops.

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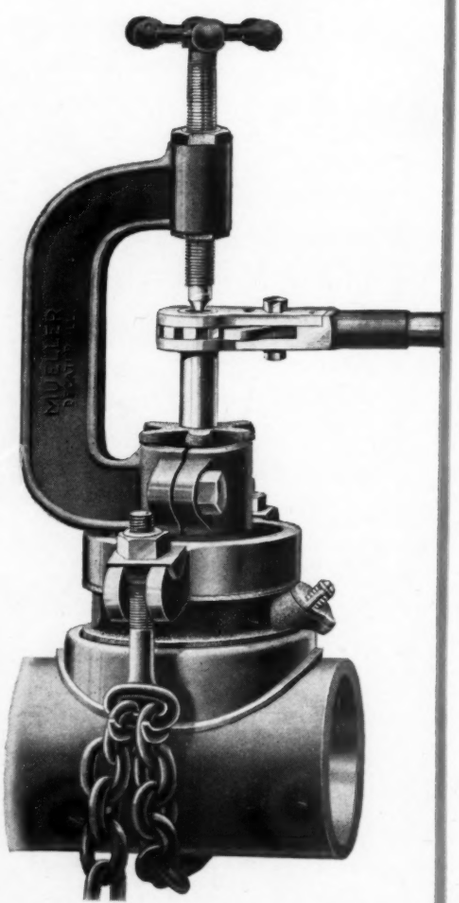

The "L" Machine, illustrated above, makes any tap from 3/8-in. to 2-in. in mains under pressure. It is strong, easily adjusted to the main, and has plenty of leverage for the largest tap.

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GAS DISTRIBUTION EQUIPMENT

REGARDLESS of the pipe material, Dresser Couplings reduce the pipe cost by eliminating special preparation of the ends; simply specify PLAIN-END PIPE FOR DRESSER COUPLINGS. In making a Dresser joint, the plain ends of the pipe are easily shoved up to the center stop in the middle ring, after which the gaskets are tightly compressed against the pipe and coupling by pulling up on the bolts. The only tool necessary — a ratchet wrench for the bolts. A coupling for plain-end pipe permits using random lengths cut in the field and oftentimes salvaging what would otherwise be wasted. Dresser Couplings permit bends and provide flexibility without in any way changing either the plain-end pipe or the coupling.

S. R. DRESSER MANUFACTURING COMPANY
Bradford, Pa.

August, 1934. Volume X, Number 8. Western Gas is published by Western Business Papers, Inc., at 810 South Spring Street, Los Angeles, California. Subscription price (in advance) 25 cents the copy; $2.00 per year; 2 years, $3.00; $3.00 per year foreign. Entered as second class matter June 1, 1925, at the postoffice at Los Angeles, under the Act of March 3, 1879.

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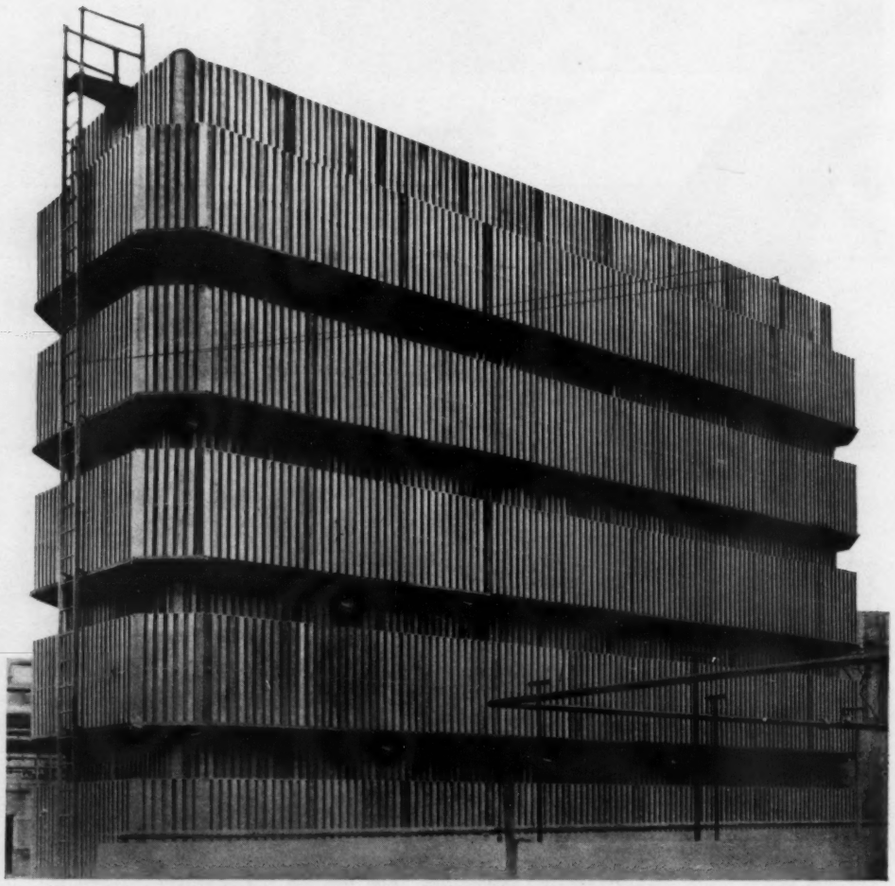
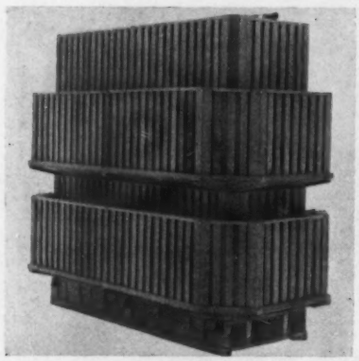
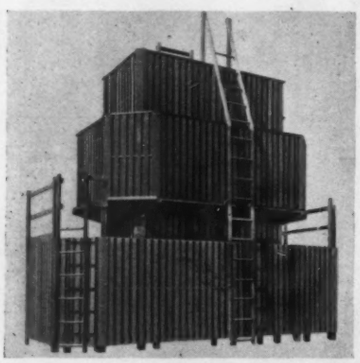




Small Fluor Tower in Redwood Basin. Aerator construction incorporated in all towers irrespective of size.



Model of a Fluor Coil Type Tower showing substructure and three decks above. Note particularly aerator construction.

EVERY structural feature of Fluor cooling towers reflects the experience of 44 years of concentrated engineering effort and progress. Fluor engineers have developed the three post frame construction providing equal strength in tension or compression. They have designed a tower that is self-supporting under 30 lbs. per square foot of wind pressure. They have designed a primary water distribution system—simple, economical and efficient. Fluor cooling decks are of patented double staggered, bowed panel construction which continually redistributes water from one side to the other and increases cooling performance. Today, more than 3,000 Fluor cooling towers are rendering efficient performances in practically every type of service throughout the world.

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YOU won't have exhaust valve trouble with these Cooper-Bessemer four-cycles. Valves are made of a special heat resisting alloy that does not burn or warp at any temperature reached in gas engine operation. This is proved by engines that have been in service for more than four years with this type of valve. Seats are made of a material similar to that used in resisting the extremely high exhaust temperatures in airplane engines. Cooling water passes directly through these heat-resisting seats. They are designed and built to take it.

THERE'S a lot of satisfaction in operating engines whose "four-cycle economy" is not offset by the expense of frequent shut-downs. These Type-80 compressor units have all the stamina for which the larger Cooper-Bessemer types are so famous. Within the power rating of 85 or 170 B.H.P., no four-cycle unit built today has established its reliability so widely and so well as the modern Type-80. Our nearest representative will be glad to tell you about installation costs, compressor capacities, performance records, and all other details in which you may be interested.

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WESTERN GAS

"Reg. U. S. Pat. Off."

Publication Office: 810 South Spring Street, Los Angeles, Calif.
District Offices: 1064 Peoples Gas Building, Chicago; 447 Sutter Street, San Francisco

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WESTERN GAS is published by Western Business Papers, Inc., 810 South Spring Street, Los Angeles, Calif.

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August, 1934

WESTERN GAS

"Reg. U. S. Pat. Off."

Vol. X, No. 8

A Monthly Journal of the Gas and Gas Appliance Industries in *Western America*

Municipal Utilities Balk at Tax Paying

WHEN Indiana's 1933 legislature decided to put municipal utility properties on the state tax roll it precipitated a fight which is now coming to a head. Indiana municipal utilities are accustomed to their special privileges and intend to see them continued, if raising legal obstacles to enforcement of the 1933 legislation will do the work. Representatives of cities which operate utilities met recently at Indianapolis to outline a course of action. The first step is an appeal to the state tax board to set aside the assessments which have been made against upwards of 100 municipal utility properties.

The municipal utilities claim the 1933 law to be unconstitutional, and insist too that assessments made under it have been high and unreasonable. Hearings on the petition to cancel the assessments are due shortly before the tax board.

If there is any serious question about constitutionality of Indiana's law taxing municipal utilities it is to be hoped that a test case may reach the courts speedily. There is no question in private utility men's minds as to the justice of such a measure; it should be the forerunner of similar legislation in every state.

More Than One Industry Affected

OPPOSITION to the TVA program and the government's companion enterprises in the power field, is gaining new recruits every day. The National Coal Association endorses the suit instituted by a group of coal companies against TVA in the Alabama federal courts. Atlanta electric appliance dealers are suing TVA on various counts involved in the appliance financing program. Union labor in the coal industry and the railroads strongly opposes the government power program, on the score that it provides a few temporary jobs at the expense of permanent jobs displaced in the coal industry, railroads, and in private utilities whose systems face disintegration due to government activities. Alabama ice companies are protesting the use of public funds or credit to finance electric appliance sales, which they foresee will mean encroachment upon ice markets.

Gas companies individually and as represented through their national and regional associations, should not cease to make their objections heard along with other interests. They have more at stake than most, for electrical appliance financing endangers gas domestic load, and cheap government power is a threat to industrial gas. TVA activities for lower electric rates cannot help but influence prospects' minds against present investment in gas equipment.

Give Employees the Full Facts

UTILITY managements as a matter of general principle consider it essential to make the most of employee contacts, which implies the need for keeping employees well informed on all situations which involve the company. Many employee informational efforts, however, fail of their purpose because they deal too heavily in generalities.

An example of some tangible information, giving employees adequate background on the subjects concerned, is at hand in an employee release prepared by the Los Angeles Gas and Electric Corp. last month. In the company's area the adoption of new low electric rates by municipal electric systems had given rise to many misstatements on relative costs of gas and electricity, spread among appliance prospects by dealers and electric competitors. The gas company saw the need for combating this misinformation with facts. Employees were given a comparison of gas and electric fuel costs for domestic cooking and water heating, showing electric costs at the new prevailing rates to range from 3.8 to 4.5 times the cost of gas for cooking, and 2.9 to 3.6 times the cost of gas for water heating. Exact comparisons for the various cities in the company's system were set up. Tables for each local area showing savings with gas, and analyzing the comparative gas and electric rates, accompanied the release. Also given were brief facts on advantages of the modern gas ranges and water heaters, and contrasting facts on electric appliances.

We cover this example of employee information at some length because it seems typical of what every company should be doing to utilize in a maximum way the legitimate promotional and defensive possibilities inherent in its own employee body.

Selling *the* Consumer *the* Househeating

By E. L. HALL

MR. HALL'S paper published in these pages is the most complete presentation of how to sell the intangible advantages of gas househeating that has come to *Western Gas'* attention. For his recommendations the author draws upon the Portland company's many years of successful promotion of manufactured gas for househeating. The discussion was one of the leading features on the Pacific Coast Gas Association's Northwest Conference program, held at Portland in June.—*Editor.*

E. L. Hall

TO SAY something instructing and original concerning house heating with gas would seem, in view of the extensive literature on the subject, a rather hopeless task. However, there is one phase of selling house heating that, in my estimation, has not been sufficiently stressed, which is selling the intangible value to the customer.

I am sure the first reaction to this statement will be that our sales appeal has been already built up around the story of the superior convenience, healthfulness and cleanliness of heating with gas. To be sure! But these are all general statements and correspondingly lacking in specific appeal.

In selling gas service we are offering the customer a product which has been refined and perfected so as to eliminate in its application for house heating purposes most of the draw-backs, inconveniences, and expense which attach to the use of the various raw fuels for house heating purposes. This being the case, a direct comparison of the gas bill with the bill for raw fuel does not tell the story nor indicate to the customer the real and over-all cost of house heating.

It is unfortunately very true that the customer does not go further in his comparisons between gas and other fuels than the direct bills for such purposes.

At this point let me illustrate from the accompanying cartoon the effect on the customer's mind of a direct comparison between gas and other fuels, in which no allowance is made for the additional items of expense, either indirect or intangible, which enter into the real cost of house heating, and which constitute a real sales resistance because of the mistaken belief that house heating with gas is prohibitive from a cost standpoint.

In the illustration, the dog is being tempted to enjoy a platter of meat but is being held back by a stout chain. The platter of meat is intended to represent the advantages of gas service, which the customer is anxious to enjoy, but he is held back by the chain which is supposed to represent the apparent high cost of gas for house heating.

Illustrating the effect upon the prospect's mind of fuel comparisons which do not give proper weight to the "intangibles" of gas service.

Weakening sales resistance is as important to the sale as building sales appeal. Know the *real* costs of competitive fuels, and use them to weaken sales resistance.

In the companion illustration presented with the cartoon we see the comparison which has just been made, expressed as a sales principle which may be stated as follows:

There are always two opposing forces working on the customer's mind which will determine whether or not he will buy. The one force, which is sales appeal, influences him to buy, while a force known as sales resistance pulls in the opposite direction.

In making a sale it is just as important, and in most cases more important, to weaken the sales resistance as it is to increase the sales appeal.

If we survey our experience in selling house heating over the past years, we must be impressed with the fact that the sales appeal of gas for house heating is fairly well established. This is indicated by the fact that we have built up a tremendous volume of gas sales for this purpose, and we know that gas has lost none of its advantages for house heating as compared to other fuels. If, on the other hand, we consider the matter of sales resistance, we find that the conditions have changed, principally because of the fact that during this period of depression, prices for raw fuels have been greatly reduced, and that the public has become very thoroughly convinced that in spite of its many advantages, gas is too expensive for house heating purposes. This opinion is very difficult to combat because of the tendency of people to make direct comparisons of fuel bills without considering the over-all expenses, which include the extras, either direct or intangible, which are inherent to the use of raw fuels. Making this condition even worse are the vague ideas which prevail regarding the furnace efficiency of various fuels, the extra expenses which are incurred in their usage, and the failure to put any cash value on certain drawbacks or in-

Real Cost *of with* Gas

Operating Manager
Portland Gas and Coke Company

conveniences such as labor, cleaning bills, etc.

We have recently reduced our rates for house heating to a point where we think that they are competitive with the majority of other fuels when all the factors are taken into consideration. These new rates do not, and, obviously, should not, compete on a bare fuel cost basis with raw fuels and we will not cash in on these rate reductions unless we inform our customers concerning the relative costs of competitive fuels.

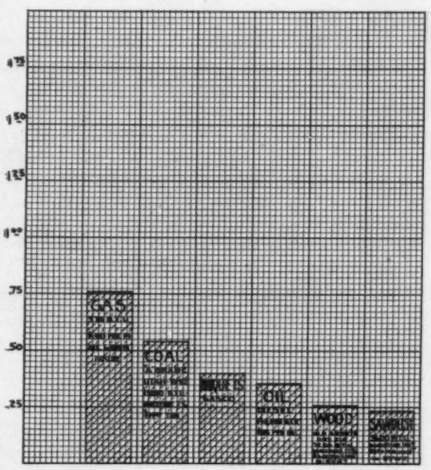


Fig. 1. Fuel cost per million B.t.u.

It is our job as salesmen to inform ourselves regarding these very real costs, and to use them intelligently in breaking down sales resistance, and thereby allow full play to the advantages of gas service in their appeal to the customer's mind. In other words, let us throw off the chain of ignorance which prevents the dog from satisfying his appetite for the tempting platter which he considers to be outside of his reach.

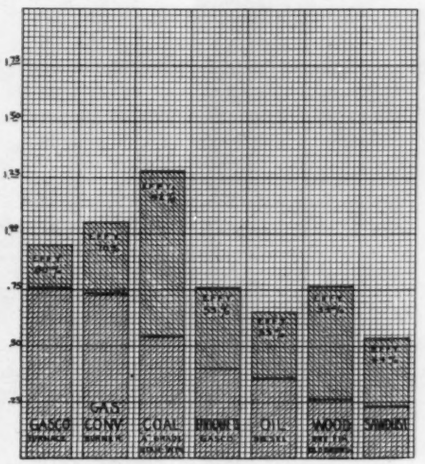


Fig. 2. Corrected for furnace efficiency.

Before we can go out and break down this prejudice on the part of the customer regarding the high cost of gas for house heating we must equip ourselves with definite facts and figures. It takes a sharp tool to cut the chain that shackles the dog. Vague generalities are not convincing. Looking at it from another way, why do we say that something is too expensive? What do we mean by that? Usually we arrive at such a conclusion by a comparison with something else which can be apparently purchased for less money. In other words, we must make comparisons between gas and competitive fuels, in which we shall assign a money value to the additional items of expense, either indirect or intangible, which are inherent to the use

TABLE NO. 1. ANNUAL OIL HEATING COSTS, COMPARING THREE NORTHWEST CITIES

(Corrected for oil used in heating water coils)
Based on 4447 Degree Days

Size House	"A" Oil Cost	"B" Oil Cost	"C" Oil Cost
5	$43.00	$54.75	$62.90
6	52.50	58.00	66.50
7	66.00	70.00	66.80
8	75.50	81.90	84.00
9	89.50	94.50	73.50
10	101.00	102.50	93.00
12	128.50	127.75	132.00
Average per room	9.60	10.30	10.30

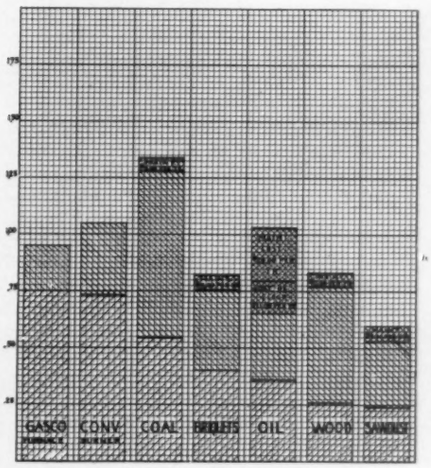


Fig. 3. Including operating costs and maintenance.

TABLE NO. 2. COMPARISON OF FUEL COSTS—PORTLAND, OREGON, JANUARY 1, 1934. (COSTS PER MILLION B.T.U.)

(For 6 room average house—80,500 M B.t.u. Heat Loss)

		FIG. 1.						FIG. 2			FIG. 3.			
											Yearly Oper. Cost			
Fuel	Kind	Unit Of Del.	Cost Per Unit	Mois. Cont.	Heat Value B.t.u.	Total B.t.u. Per Unit	Fuel Cost Per Million B.t.u.	Over-All Eff.	Corr. For Furn. Eff.	Sub-Total Corr. For Eff.	Rep. & Maint.	Elec. Cost	Corr. For Oper. Cost	Sub-Total Incl. Oper. Cost
Gas	Gasco Furnace	M c.f.	$ .433	....	570/c.f.	570 M	$.76	80%	$.19	$ .95	.....	.....	....	$.95
Gas	Conversion Burner	M c.f.	.418	....	570/c.f.	570 M	.733	70%	.317	1.05	.....	.....	.....	1.05
Coal	"A" Grade Utah & Wyoming	Ton	14.00	7%	13000/lb.	26,000 M	.538	42%	.742	1.28	$5.00	.....	.06	1.34
Briquets	Gasco	Ton	12.00	....	15000/lb.	30,000 M	.40	53%	.355	.755	5.00	.....	.06	.815
Oil	Diesel	Gal.	.05	....	140000/gal.	140 M	.357	55%	.293	.65	20.00	11.00	.377	1.027
Wood	Old growth fir in basement	Cord	6.00	17%	7250/lb.	23,200 M	.258	33%	.514	.772	5.00	.....	.06	.83
Sawdust	Good Grade	Unit	4.50	28%	5600/lb.	19,320 M	.235	44%	.299	.534	5.00	.....	.06	.594

TABLE NO. 2.—(Continued). COMPARISON OF FUEL COSTS—PORTLAND, ORE., JAN. 1, 1934. (Costs per million B.t.u.)
(For 6 room average house—80,500 M B.t.u. heat loss.)

	FIG. 4.					FIG. 5.		
	Fixed Charges					Intangibles		
	Orig. Cost	Int. On Invest.	Depr.	Corr. For Fxd. Chgs.	Sub. Total Incl. Fxd. Chgs.	Yearly Total	Corr. Intangibles	Total Incl. Intangibles
Gas	Furn. $245	3.5%	10%	.41	$1.35	.....	....	$1.36
	Furn. $ 90			.15				
Gas	Burn. $160	3.5%	10%	.268	1.468	.....	....	1.47
Coal	Furn. $ 90	3.5%	6.66%	.114	1.454	34.50	.43	1.88
Briquets	Furn. $ 90	3.5%	6.66%	.114	.929	18.25	.227	1.16
	Furn. $ 90			.15				
Oil	Burn. $360	3.5%	10%	.604	1.78	5.00	.063	1.84
Wood	Furn. $ 90	3.5%	6.66%	.114	.944	30.50	.38	1.32
	Furn. $ 90			.132				
Sawdust	Burn. $ 45	3.5%	8.3%	.066	.792	18.25	.227	1.02

of raw fuels. We will then find that these raw fuels are not relatively cheap when compared to gas for house heating purposes.

In Portland, during the past few years, we have been confronted with a very severe competitive condition which has wiped out a substantial portion of our heating load, due principally to the necessity for household economy, brought about by business conditions, and partly, also, to the encroachments of oil heating and cheap wood. It has been necessary, recently, to make radical revisions of rates downwards in order to meet this competition and it was realized that rates could not be established on the basis of bare fuel cost and that it was necessary to assign a dollar value to some of the factors, that could be so evaluated, in order that the real cost of competitive fuels could be ascertained and demonstrated to our customers.

Our principal competitor for house heating is oil. We have some rather authoritative figures on the cost of heating various sized homes with oil in Portland, Seattle and Tacoma, as shown on Table No. 1. To bring these figures to a comparable basis it has been necessary to correct for the difference in local climatic conditions and make certain arbitrary deductions for hot water coils in furnaces. After these corrections are made there is rather reasonable similarity in the figures. In the following comparisons we have used the Portland figures for oil as well as for other fuels.

Fig. 1* shows the comparative cost of competitive fuels in Portland, Oregon, at the present time, on the basis of the cost per million B.t.u. as delivered to the customers. It will be at once noticed from this comparison, that on a bare fuel value basis, the position of gas is far from competitive.

It was realized, of course, that the actual usable heat derived from these fuels in the domestic furnace would vary with the composition and burning characteristics. Unfortunately, the literature is very vague on the furnace efficiencies of various fuels. Neither was it altogether desirable to rely entirely on theoretical figures.

We therefore equipped our Utilization Laboratory with a typical warm air furnace fitted with necessary measuring instruments of all kinds, and during the past year have made a very complete, and I think, accurate study on the efficiencies of various fuels under similar conditions.

These results are set forth in Fig. 2 and it will be noticed at once, that the higher combustion efficiency of gas, as compared to the other fuels, has greatly improved its relative position, but has not yet resulted in any advantageous position. At this point, I would like to remark on certain characteristics of fuel which very much affect the furnace efficiency, and that is the percentage of volatile matter. Generally speaking, the furnace efficiency of a solid fuel is highest when it contains the least amount of volatile matter, that is to say, when burned under the ordinary furnace conditions on a grate. Oil and gas, which are burned in special burners, attain considerably greater furnace efficiency, gas being the highest of all due to its regulated and systematic combustion.

This explains, for instance, why carbon briquets, having only 15 per cent volatile matter, show so much greater efficiency than Wyoming coal having 40 per cent volatile matter.

In Fig. 3 we have burdened the fuel with the ordinary maintenance expenses which appertain to the furnace installation. Here again gas furnaces are fortunately free from much expense of this kind, whereas solid fuel furnaces, and especially oil burning equipment, require a considerable annual expenditure for maintenance. By this time the position of gas has considerably improved.

Fig. 4 superimposes on the other costs the fixed charges created by the cost of furnace and fuel burning apparatus. In this comparison, of course, the customer is supposed to be in position of not having a furnace of any kind and under necessity of deciding on the type of fuel and furnace. But at any rate, this chart shows the real over-all costs of house heating, even though the chart is not particularly useful when changing from one fuel to another where there is already a furnace installed.

At this point, gas is very reasonably competitive and the salesman can go out and by pointing out the small difference in the cost of using gas with other fuels, win out on the basis of the other advantages. However, the mere recitation of these advantages is not as convincing as it might be from the standpoint of the customer's pocket-book. I have, therefore, made an attempt to show the cash value of some of these intangibles. I wish to say, at this point, that while the data that have been shown heretofore, are reasonably accurate, the following presentation is more or less a matter of personal opinion and must not be taken too seriously. (Table No. 3.)

In this table there have been listed certain of the intangible advantages on which a reasonable cash value can be placed. We have, for instance, the matter of labor for furnace attendance. Now, it is a rather difficult matter to place a price on the time which the house holder devotes to this purpose and this will vary with different individuals. I have tried to strike a fair average by taking a figure of $3.00 per month. I have checked this estimate by interviewing 76 people on the basis of what they would actually pay out to a neighbor, or furnace man, if available, who would relieve them of the worry of building fires, removing ashes, etc., and who would be willing to drop in several times per day to replenish the fuel. The average of all the replies was $3.75 per month. Using 30 weeks as a furnace season, we arrive at $22.50 for the season's expense.

Some of the other intangibles have been placed very low and in some instances, the expenses amount to consider-

*Table No. 2 gives data pertinent to Figs. 1-5.

ably more than the estimate, but I think that they are so low that they will be readily conceded without argument.

Now, let us turn to Fig. 5 where these intangible costs have been added to the other expenses shown in Fig. 4. You will see from Fig. 5 that gas is now quite competitive with other fuels; in fact only sawdust and briquets show any advantage. Of course, so far as the Portland company is concerned, we are willing to see briquets get part of the business. This leaves only sawdust as

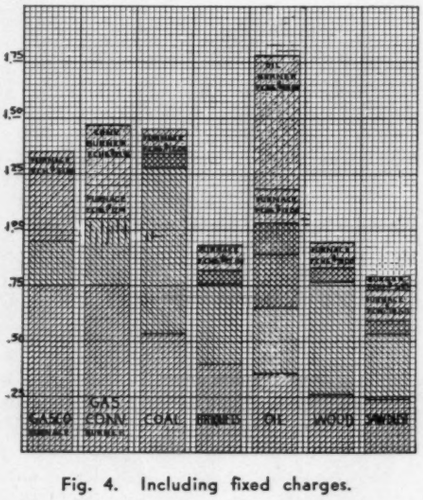


Fig. 4. Including fixed charges.

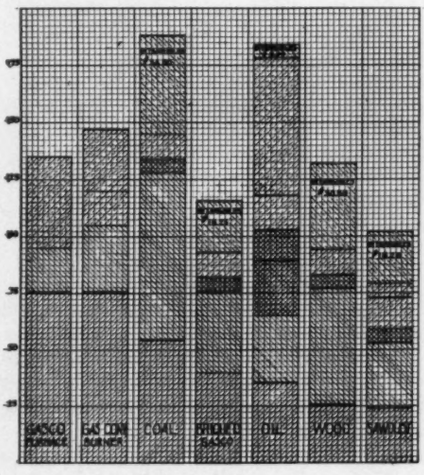


Fig. 5. Including intangible costs at fair valuation.

being a cheaper fuel, everything being considered, than gas.

I think we can be well satisfied that we have a strong competitive condition if we can outsell oil, coal and wood, on the basis above outlined, without worrying over sawdust.

We have now the other intangibles which I have not made an attempt to assign money value to. I think that if a definite survey were made and the personal opinions of a large number of people obtained, that a cash value could also be assigned to these intangibles:

The comfort secured by maintaining the home at a desired temperature.

The personal satisfaction of having the home clean and free from litter, dust and dirt.

The flexibility of gas house heating which allows instant heat when needed and no wastage when no longer required.

The saving in storage space which enables the basement to be converted into an extra room, play room or work room, or other desired purposes.

The elimination of hazards from overheated chimneys and the presence of fuel on the sidewalk when being delivered.

The more pleasant and healthful conditions which result from the removal of the smoke nuisance.

The doing away with insects and vermin brought in by other fuels.

The lack of uniformity in other fuels, shortage of weight, wet fuel, delivery uncertainties.

The necessity of paying for the fuel in advance and in a lump sum.

Interruptions in service due to the dependence on other service, such as electric pilot light ignition.

Enough has been said concerning intangibles to point out their overwhelming importance in connection with selling gas service for house heating and to the necessity for a more definite and specific appeal to their money value.

Our task is by no means completed when by reason of intelligent comparisons we are able to induce the customer to put in an installation. It is just as important to keep this installation sold in order to build up satisfied customers who will be boosters for gas house heating. One of the unfortunate things about selling house heating is that no two jobs are alike. We can, to be sure, talk about the average cost of gas house heating as compared to other fuels, but such generalities are not convincing to the individual customer who makes comparisons with his neighbors' bill or who finds that the cost of his particular installation is running over his estimate. It is necessary for us to be prepared in meeting this condition by having certain yardsticks according to which we may measure the effect of the various conditions that we encounter on the individual premises and be able to point out to the consumer how his costs relate to such conditions so that if desired he may remedy them.

If all of the various conditions, including personal habits of the consumer, conformed strictly to the average, we would have what might be called a standard bill for each size house, based upon local climatic conditions and cost of gas.

This condition is illustrated in Table No. 4 and is entitled "Gas Consumption in M c.f. for Normal Heating of Various Sized Houses, B.t.u. of Gas 570, Normal Degree Days 4447" and in turn is based upon Table No. 5 which shows the monthly percentages of season's heating requirement for a normal year.

What then are the factors that cause a variance in customer's bills for the same sized home?

These may be classified roughly into five major causes, as follows:

(a) Abnormal seasonal temperatures.
(b) Excessive house temperatures maintained by customer.
(c) Poor house construction or insulation.
(d) Lack of, or faulty thermostatic control.
(e) Careless operation of heating equipment.

Let us discuss each one of these cases in detail.

(a) Abnormal Seasonal Temperatures

By reference to Table No. 5 the temperature deficiency by months in degree days for Portland, Oregon, is shown as a percentage of the season and as a percentage of normal. By reference to this chart the consumer's bill can be readily corrected back to normal.

(Continued on Page 22)

TABLE NO. 3. COSTS OF INTANGIBLE EXPENSE IN CONNECTION WITH USE OF VARIOUS FUELS FOR HEATING.

(For average 6 room house)

	Gas	Coal	Briquets	Oil	Wood	Sawdust
Attending furnace (30 weeks at .75 per week)*	—	22.50	11.25	——	22.50	11.25
Ash removal (per heating season)	—	5.00	——	——	1.00	——
Excess cleaning of basement, house, rugs, draperies, clothes, etc. (per heating season)	—	5.00	5.00	5.00	5.00	5.00
Medical attention due to variation in temperature	—	2.00	2.00	——	2.00	2.00
TOTAL	—	34.50	18.25	5.00	30.50	18.25
* Less for briquet and sawdust						
Storage space for fuels	—	X	X	—	X	X
Public hazard for fuel on sidewalk (1½ of cost of insurance)	—	—	—	—	X	X
Breeding of vermin in stored fuel in basement	—	—	—	—	X	X
Uncertainty of fuel supply	—	—	—	—	—	X
Lack of uniformity of fuel	—	X	—	—	X	X
Smoke nuisance	—	X	X	X	X	X
Fire hazard from overheating	—	X	X	—	X	X
Operation dependent on other service	—	—	—	X	—	—

Pilot Grounds *for* Protection *of*

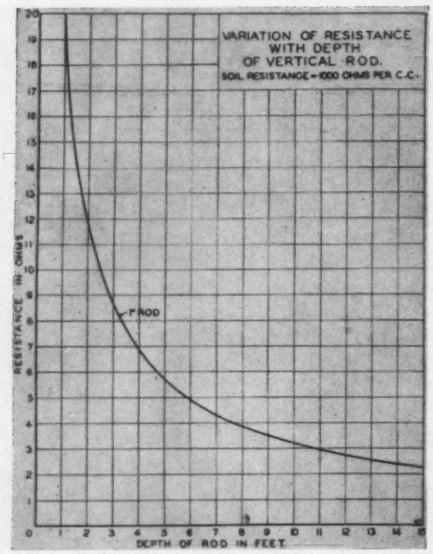

VARIATION OF RESISTANCE WITH DEPTH OF VERTICAL ROD.
SOIL RESISTANCE = 1000 OHMS PER C.C.
RESISTANCE IN OHMS
1" ROD
DEPTH OF ROD IN FEET

FIG. 1.

A BRIEF description of a few of the essential details of the first successful application of cathodic protection was given to pipe protection committees in 1931. This electrical protection was used to supplement the regular bituminous protection on a natural gas transmission line near San Francisco.

A detailed description, giving the various reasons for the selection of apparatus and the spacing of the component parts, was not given, to avoid over-optimistic statements that would have to be retracted later.

Since that time numerous additional installations have been made by the Pacific Gas and Electric Co. in central California, and also by other companies in the southern states and in southern California.

Pilot ground electrodes, to pilot the current away from a pipe before it is discharged into the soil, have been made up in various ways and of different materials, for the cathodic protection installations, but the impression seems to prevail in the minds of many electrolysis engineers that the pilot electrodes must be placed at "300 to 500 feet" or at least "several hundred feet" from the line to be protected.

The long distances of 300 and 500 feet used on the original installations in 1930, were not determined by any electrical requirement, but were necessary to keep the equipment out of the range of the rifles of hunters who indulge in target practice on insulators, meter boxes and other electrical equipment. Meanwhile, recommendations and specifications are still being drawn up calling for spacings of several hundred feet.

This shows that it is desirable that the subject of pilot ground electrodes and their location should be treated in detail in order to reduce or eliminate the unnecessary expense entailed by such great spacing, in the purchase of additional property or right-of-way.

Ground rods generally discussed in technical literature are used for alternating current systems. They are required to carry only a small current, so that the drying out of the soil due to energy loss is negligible.* The amount of electrolytic products produced by the alternating current is small. Except in the case of station grounds the resistance is usually comparatively high, ranging up from 1 to 50 ohms and more.

Ground connections used for cathodic protection systems carry relatively large, direct currents continually, and the products of the electrolytic action of the currents remain around the electrode. The drying out action of the current on the soil is likely to be severe unless precautions are taken to keep the current densities at the electrode surface low.

The two types of electrodes most generally used are the horizontal type buried in one or more trenches and the driven rod type, consisting of one or more rods placed vertically in the ground and connected in parallel.

These two types will be discussed in the following pages. In all cases a soil resistance of 1000 ohms per cubic centimeter is used and the resistance of the ground connection in soils of other resistivities will be proportional to the values given.

A study of the available data on driven and buried ground rods, shows that when installed in a homogeneous soil, the logarithm of the resistance is a straight line function of the logarithm of the depth to which the rod is driven. A similar relationship holds between the logarithm of the resistance and the diameters of the rods, and also between the logarithm of the resistance and the distance between rods when connected together and operating electrically in parallel.

The values used in plotting the curves used in this paper have been obtained by means of the relationship mentioned above.

*Ground Connections for Electrical Systems. O. S. Peters, Technologic Paper No. 108, Bureau of Standards, 1918.

Vertical Ground Rods

The variation of resistance of a 1-inch O.D. rod driven vertically into a homogeneous soil having a specific resistance of 1000 ohms per cubic centimeter, a length varying from 1 to 15 feet and at a distance from the return ground connection of several hundred feet, is shown in Fig. 1.

This curve shows that the resistance drops very rapidly as the rod enters the soil. After passing through 8 or 10 feet of soil, the reduction of resistance is very low. In the case of the 1-inch rod shown in Fig. 1 the resistance drops 12 ohms as the depth is increased from 1 foot to 2 feet, whereas an additional foot driven from the 14-foot level decreases the resistance only .15 ohm.

If the rod penetrates a different formation or a water-bearing strata at the lower depths, there will be considerable deviation from the curve.

The reduction of resistance that is effected by increasing the diameter of the rods is shown in Fig. 2. The resistance of a rod driven in shallow soil decreases more rapidly as the diameter is increased than is the case with a rod driven to a greater depth. Examination of this curve will show that if a rod cannot be driven to a great depth, the resistance may be decreased by using a rod or pipe of larger diameter. For example a pipe placed vertically to a depth of 5 feet will have the same resistance as a 1½-inch rod driven to a depth of 8 feet.

If a lower resistance is required than can be secured by use of a single rod up to 3 inches in diameter and 8 to 10 feet long, the most practical method of bringing about a further decrease is to place two or more rods in parallel.

The use of a number of rods in parallel brings in the additional factor of spacing. A large number of rods placed close together may have a higher resistance than fewer placed farther apart. If two or more similar rods are connected in parallel and the spacing be-

Cathodic Pipe Lines

By W. R. SCHNEIDER *Bureau of Tests & Inspection Pacific Gas and Electric Company**

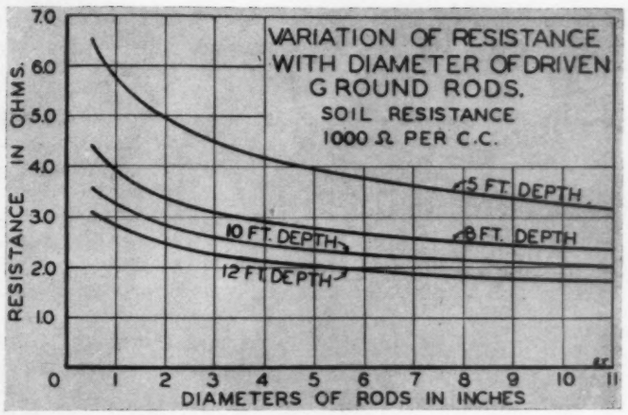

VARIATION OF RESISTANCE WITH DIAMETER OF DRIVEN GROUND RODS.
SOIL RESISTANCE 1000 Ω PER C.C.
RESISTANCE IN OHMS.
5 FT. DEPTH
8 FT. DEPTH
10 FT. DEPTH
12 FT. DEPTH
DIAMETERS OF RODS IN INCHES

FIG. 2.

tween them is approximately 200 times the diameters of the rods, the combined resistance can be found by dividing the resistance of one rod by the number of rods used. In other words, the combined resistance varies inversely with the number of rods. If the spacing between the rods is reduced the combined resistance is increased due to the interference of the electric fields of each rod. This is shown in Fig. 3.

The vertical ordinate shows the resistance of a group of rods, spaced as indicated, in percentage of the resistance of a single rod remote from all other active current-carrying, grounded structures.

A study of the curves in Fig. 3 shows that frequently a considerable saving can be effected by changing the spacing of the rods rather than increasing their number. For example, a resistance of 40 per cent of a given single rod may be obtained driving eight rods 12 diameters apart or only three rods and spacing them 100 diameters apart.

This is particularly important if the ground conductors are large, and driving or installing is difficult and expensive.

If the rods are made of other materials than steel, such as carbon, driving is out of the question, and the necessary excavating expense will prove to be an important item.

The following will show the method of laying out a ground rod installation:

Final ground rod resistance to be attained	.02 ohm
Soil resistance as determined by sampling soil	200 ohms per c.c.
Length of rod to be driven in ground	12 feet
Diameter of rods, O.D.	3 inches
From Curve in Fig. 2:	
a 3-in. x 12-ft. 0-in. rod in 1000 ohms per c.c. soil will have a minimum resistance of	2.25 ohms
Resistance in 200 ohms per c.c. soil $\frac{200}{1000} \times 2.25$	.45 ohm
Final resistance of ground $= \frac{.02}{.45}$	4.5%

The curves for the resistances of parallel ground rods, shown on Fig. 3 do not give values below 10 per cent so that the number of rods required for three times this resistance can be determined—13.5 per cent.

Fig. 3 shows that 8—3-inch rods spaced 180 diameters or 45 feet apart, or 10—3-inch rods spaced 120 diameters or 30 feet apart, are required for a resistance of 13.5 per cent.

The number of rods required for the ground resistance of .02 ohm, or 4.5 per cent, is three times the above number or 24—3-inch rods spaced 45 feet apart, or 30—3-inch rods spaced 30 feet apart.

These rods must be located so that no rod will be at less than the specified distance from any other rod.

The exact distribution of these rods and the number to be used will depend on the size and shape of the site available, as well as the geologic formation.

The final resistance of the ground system when measured after completion of the installation, may differ from the calculated values to some extent, as it is seldom possible to obtain a homogeneous soil to a depth of 12 feet.

*Presented at Pacific Coast Gas Association 1934 Technical Section Conference, held at Los Angeles, Calif.

Advantages of Vertical Rods

1. If rods are of small diameter and soil is reasonably free of boulders and of sufficient depth, they are easily installed.
2. Smaller area of land is required for the ground bed than for horizontal strips or pipe. This is an important item if the land must be purchased.
3. Vertical rods can be driven in wet soil, such as marsh lands, in which pumps would be required to keep the water level low during the construction period.

Disadvantages of Vertical Rods

1. Upper portion of the rod may be in very dry soil during the summer months, thus reducing the active area. This can be overcome by driving the rods in pits, or lengthening the pipe if the formation will permit deeper driving.
2. Rods are difficult to use in shallow ground underlaid with hardpan or rock.
3. Due to depth, rods or vertical pipes are difficult to examine in place to determine the progress of the corrosion.
4. If placed in cultivated areas, land must be purchased if rods extend above ground or near enough to the surface to interfere with plowing.

Horizontal Pilot Ground Electrodes

Horizontal pilot ground electrodes, of the type used on the original cathodic

(Continued on Page 40)

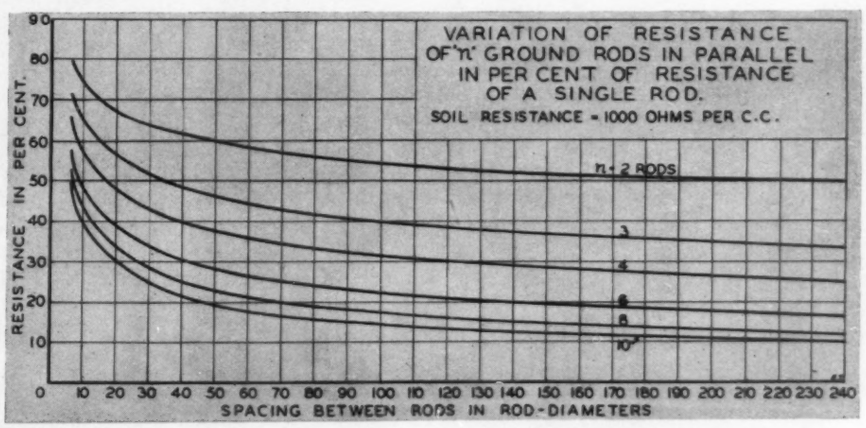

VARIATION OF RESISTANCE OF 'n' GROUND RODS IN PARALLEL IN PER CENT OF RESISTANCE OF A SINGLE ROD.
SOIL RESISTANCE = 1000 OHMS PER C.C.
RESISTANCE IN PER CENT.
n = 2 RODS
3
4
6
8
10
SPACING BETWEEN RODS IN ROD-DIAMETERS

FIG. 3.

UTILIZATION

Manufactured Gas In the Steel Industry

● **H. ALEX FELLS, Chief of Fuel Research Department, Sheffield Gas Co., England; addressing annual general meeting, Institution of Gas Engineers, London, England, June 5-8, 1934.—(Abstract):**

DESCRIBING the utilization of 500 B.t.u. manufactured gas as a source of industrial heat, and a means of controlling furnace operation and atmosphere, in competition with other available fuels.

In many heating operations the bulk of the cost of heating does not lie in the cost of the fuel used, but rather in the many expensive processes necessary to remove or repair the surface and internal damage done during heating. Town gas is well suited to steel furnace work, as it can be burned easily and completely in burners of simple and robust design; the flame produced is readily adjusted for heat distribution; the degree of combustion can be varied with respect to excess of air or gas; the high air/gas ratio enables greater use of waste heat recovery; it is adapted for use in unique and special furnace design.

SUMMARY OF COMPARATIVE TESTS OF OIL AND GAS AS FUEL FOR HEAT TREATMENT OF STEEL PARTS

(Oil at 58.5 shillings per ton; gas at 1 shilling per 1000 cu. ft.)

	Oil	Gas
Hours worked	184.5	122
Hours lit	115	59
Output per hrs. worked (Cwts.)	1.86	2.35
Oil or gas used (Gals. or cu. ft.)	1019.4	190,325
Oil or Gas per hr. lit (Gals. or cu. ft.)	8.9	3,225
Costs per hour worked (shillings)	1.33	1.56
Costs per hour lit (shillings)	2.17	3.21
Costs per cwt. output (shilling)	0.73	0.66
Costs per ton output (shillings)	14.67	13.25

OIL VS. GAS—EMPTY FURNACE TEST

	Oil	Gas
Time required to raise furnace from 310 to 850 Deg. C.	8.5 hrs.	6.5 hrs.
Amount of fuel required	93.1 gals.	23,760 cu. ft.
B.t.u. required (in millions)	16.18	11.88
Cost—same basis as above (shillings)	22.88	23.75
Cost per hour lit (shillings)	2.69	3.60
Period of maintaining at 850 Deg. C.	5 hrs.	3 hrs.
Fuel required per hour	5.0 gals.	1,120 cu. ft.
Cost of fuel per hour (shillings)	1.19	1.096

Furnace Atmosphere—Scaling

To prevent scaling, or to produce the so-called neutral atmosphere, it is not merely necessary to reduce the oxygen to zero. Water vapor is a scale-forming agent; at temperatures above 1100 Deg. C. it is more powerful in this respect than air. Tests at temperatures below 1050 Deg. C. show that the scaling action of mixtures of water vapor and carbon dioxide in nitrogen is practically proportional to water vapor content. Carbon dioxide also forms scale. Reducing gases such as found in raw gas serve somewhat to counteract the effect of these scale-forming constituents. The following summary is given:

1. Exclusion of oxygen is of paramount importance.

2. More than 0.5 per cent of oxygen added to a neutral atmosphere results in very much increasing the weight of scale formed.

3. A small addition of oxygen produces a very marked scaling effect, while a small addition of unburned gas produces only a trifling non-scaling effect.

4. The amount of a reducing agent, such as unburned gas, required to prevent scaling, or even to reduce it by half, represents a quantity of potential heat of the same order as that of the fuel required to heat the furnace in the first place.

With solid fuels, it is practically impossible to obtain combustion without excess air. Consequently, the possibility of the formation of scale by water vapor or carbon dioxide is tremendously outweighed by the scaling action of the free oxygen which is present in the atmosphere produced by the ordinary methods of burning coal, coke or oil.

Decarburization has been encountered in practically every type of furnace and in many forms of heat treatment. The facts on which there is most agreement are as follows:

1. Of the gases present in an open fired furnace moist hydrogen has by far the strongest decarburizing action. Since moist hydrogen is usually present when a furnace is fired with excess gas, it is probably largely responsible for the relatively greater amount of decarburization that is produced in an atmosphere containing excess gas.

2. Pure dry hydrogen is very much less active in producing decarburization than is moist hydrogen. Small amounts of water vapor, less than 1 per cent, will rapidly increase the degree of decarburization.

3. Next to moist hydrogen, carbon dioxide is the most serious offender.

4. Nitrogen, when absolutely pure, does not cause decarburization. Ordinary commercial nitrogen does cause it.

5. Scale formed on the surface of steel has a pronounced effect on decarburization, usually by inhibiting it. Decarburization is usually deeper when no scale is formed on the steel. Actually decarburization may take place during the formation of scale, but its degree is masked by the conversion of the ferrite to iron oxides.

6. It has been found that the more strongly oxidizing the furnace atmosphere, as measured by the amount of free oxygen, the less is the tendency to show decarburization in the steel, and, conversely, increasing the amount of unburned gas increases the tendency to show a decarburized surface.

A mixture containing carbon dioxide in nitrogen with only a very small percentage of water vapor can be obtained by the simple method of cooling the products of theoretical combustion of gas. It is not difficult to cool sufficiently to have a percentage of water vapor as low as 1.8. Such a mixture of gases in a muffle will have a very much reduced tendency to form scale, or even to decarburize, but at high temperatures such as 1300 degrees C. this mixture will form a certain amount of scale, due to the carbon dioxide and to the very small amount of water vapor present. But to prevent these two gases having any scaling action whatever, and furthermore to prevent them from removing carbon from the surface of steel, requires but a very small amount of unburned gas in addition.

Air Conditioning with Heating Systems

● **E. L. PAYNE, Payne Furnace and Supply Co., Los Angeles; addressing Northwest Regional Conference, Pacific Coast Gas Association, Portland, Oregon, June 21-22, 1934; topic "Air Conditioning for Comfort Through the Heating Cycle"—(Abstract):**

THE greatest opportunity for immediate sales and profits, with respect to air conditioning, is built around the heating system, both existing and potential. An examination of practically all present warm air furnace installations will disclose that they do not provide the maximum of utility and comfort but will stand a great deal of improvement. We should deliberately acquaint the customer with the deficiencies of his heating installation and

turn him into a dissatisfied owner and therefore a good prospect for further and future sales. Witness the automobile industry, where the greatest volume of sales are to dissatisfied customers, who have been sold acceptable cars and have then almost immediately been confronted with new and improved models. We are handicapped by not being able to give them the ride to dissatisfaction with the new heating system; however, with constructive, intelligent sales efforts in the direction of providing clean air, properly humidified and circulated with equitable temperature controls, we can make the public realize that the furnaces they have are not necessarily good heating systems and that the degree of heating satisfaction is only relative to their experiences.

E. L. Payne

The problem is to paint the picture, with concrete, understandable statistics, that a modern system can improve living conditions, affecting health and comfort more than any other service available; that it is not only an absolute necessity but a good investment, paying good interest by reducing doctor and cleaning bills, wear and tear on furniture, rugs and draperies. Moreover, it enhances the value of the property many times the original cost.

With the heating equipment available, nothing is lacking to make an installation that will satisfy those most difficult to please. The simple gravity system is, and will be for some time to come, the system serving the larger number of homes. However, unless effort is made to sell better and more modern systems to the ones who can afford them, progressive competitors will take the lead.

The warm air furnace offers the greatest possibilities for air conditioning, because heating is the first and most important step, and the warm air furnace installation with its duct system is the best foundation for heating and air circulation available for residential air conditioning, and lends itself to the two additional operations of air cleaning and humidification.

If a choice has to be made between cleaning and humidification, the latter is the most desirable to obtain as giving the greatest benefit with respect to health and living conditions. If cold air is taken in from the inside and merely heated, its humidity will be very low. This dry air causes excessive evaporation of moisture from the skin surface and mucous membranes, tending to make them dry and interfering with their normal functions; it also dries the furniture, draperies, rugs, etc., thus liberating an excessive amount of dust and bacteria and increasing the liability of infections of many kinds from many sources.

Means of humidification vary from water pan evaporation to spray systems controlled by automatic humidistat—not difficult or expensive to install, but sadly neglected by the industry in their proper function and presentation.

With respect to air cleaning for the protection of human beings, little has been done until the past few years. We have completely neglected the air we breathe, in spite of having developed dirt protection for food, water, and industrial processes and machinery. In reality, bacteria-laden dust particles are ordinarily found in greater volume in the air than in water or food, and dust constitutes one of the greatest menaces to the home.

To properly filter the air entering the home is not an expensive matter for either installation or operation. There are many kinds of filters on the market adaptable to small house heating systems. Most of them are of the throw-away type, and usually one set will last a season. They can be installed on a gravity system in some cases, when used only in the heating season, but preferably are used with a blower.

If the blower and filter are to be adapted to an existing furnace installation with return circulation, an outside air duct with by-pass dampers should be introduced into the system for summer use or for diluting the return air. If a blower is to be used with a gravity designed furnace, care must be taken to direct the air against the heating surfaces in a proper manner, so that heat will be absorbed adequately and evenly.

Capturing the air conditioning load will require reinforcements in the form of educational advertising and the concerted effort of the entire air conditioning industry, including the comfort cooling equipment section. Now is the time for the industry to fortify itself with the necessary knowledge of fundamentals and working practice so that when conditions are better the opportunity can be grasped.

TRANSMISSION

Installing and Testing Recording Thermometers

● **R. L. ROUNTREE, United Gas Public Service Co., Houston, Texas; addressing Southwestern Gas Measurement Short Course, Norman, Okla, April 24-26, 1934; topic "Report of Sub-Committee on Recording Thermometers"—(Abstract):**

ALL of the present-day recording thermometers used for the measurement of flowing gas temperatures are of the closed system, helical or Bourdon spring type, operating from the resultant pressure increase exerted in the spring as the medium in the bulb expands or yields greater vapor tension when heat is applied. There are three general classes of recording thermometer systems, each having its own characteristics which govern, to a great extent, its suitability for a particular application. These are the liquid filled, the vapor tension, and the gas filled types.

It is usually practicable to use separable sockets for thermometer bulbs in recording flowing temperatures of gases under pressure. These sockets are specially designed by the manufacturer to fit a particular size and style thermometer bulb. (See Paragraph 18, Chapter 1, of the A.S.M.E. Power Test Codes of 1929, Instruments and Apparatus, Part 3.)

The use of separable sockets with radial fins may be particularly desirable when constantly changing gas temperatures are to be measaured, as the fins compensate somewhat for the comparatively low rate of heat transfer from the gas to the thermometer bulb. Most manufacturers can furnish finned sockets upon request.

Installation

In general, the recording thermometer socket should be so placed that the bulb's sensitive portion will always be fully in the stream of flowing gas. It is recommended that the socket extend at least halfway into the meter tube or header. It is further recommended that a test well large enough for a mercury-in-glass thermometer be placed in line with the socket and at the same distance into the pipe.

It has been found that, when metal-to-metal contact is not made between the bulb and its separable socket, the placing of light oil (mercury may be used when bulb and socket are steel) in the socket to make the contact reduces time lag in the recording of changing temperatures.

Since the thermometer socket may tend to carry or radiate heat to or from the pipe wall when gas velocities are low or when the temperature of the flowing gas differs greatly from that of the surroundings, it may be well to insulate the exposed portion of the pipe for some distance from the thermometer socket (if the placing of such insulation will not materially affect the temperature of the gas to be measured) and to insulate exposed portion of the separable socket.

It is advisable, particularly in setting thermometers which are not compensated for ambient temperatures, to use as short a capillary tubing length as practicable. It is also advisable to provide a well ventilated shelter for recording thermometer cases not only for weather protection but also to minimize ambient case temperature effects. The thermometer case should be rigidly mounted in an upright position, care being taken that such warping of the case will not occur which might damage the recording mechanism.

For orifice meter installations, the thermometer well (or socket) should be located on the downstream side of the orifice and not nearer than three pipe diameters to the meter pressure tap. (Specification of the A.G.A. Gas Measurement Committee Report No. 1.)

For meters of the positive displacement type, it is recommended that the thermometer socket be placed on the downstream side of the meter and as near the meter as practicable. Care should be taken to overcome effects of heat transfer and radiation between the walls of the pipe and the thermometer socket, particularly when gas velocities are low (as is often the case with this type of measurement) and when the pipe walls are exposed to the weather.

Periodic calibrations should be made of recording thermometers in which test comparative readings throughout the working range are taken from the recorder and a reliable glass-stem test thermometer, with both thermometer bulbs placed together and immersed in the same liquid bath. The following precautions should be observed in this test: That the test thermometer is accurate; that the sensitive portion of the recording thermometer bulb and the test thermometer bulb are fully immersed in the bath; that the bath is well stirred; that a *constant* temperature at each calibration point is maintained for several minutes; that proper emergent stem correction is applied to the test thermometer when room and bath temperatures are widely different; and that the recorder's pen follows the time arc line of the chart. It is recommended that the recording thermometer be checked at several points in both an ascending and descending order so that lost motion in the mechanism or fatiguing of the spring may be detected, if present. Test bath temperatures below 32° F. may be obtained with well stirred salt-ice-water mixtures.

When testing thermometers of the vapor tension type, the same relative elevation of bulb and case should be maintained as in actual use; this also applies to liquid filled thermometers whose cases are set much higher or lower (say, 10 feet) than their bulbs.

DOMESTIC SALES

Spectacular Campaigning Sells Radiant Heaters

• **William F. Eve, Jr., general commercial manager, Atlanta Gas Light Co. and affiliated companies; addressing Southern-Southwestern Regional Sales Conference, A.G.A., Memphis, Tenn., March, 1934; topic "Space Heating Possibilities Through Radiant Heaters."—(Abstract):**

A DEFINITE plan of campaign set up well in advance and executed with systematic attention to details and the cooperation of all company employees, may be relied upon for volume sale of radiant heaters. This conclusion is borne out by the "house warmers" campaign carried on by the Atlanta Gas Light Company and 26 affiliated companies operating in Georgia, Florida and Alabama, from September 18 to December 9 of 1933.

William F. Eve

Meters of the participating companies totaled 83,468, and employees 597. Heaters sold by company representatives numbered 11,739 and cooperating dealers sold 3,263, a total of 15,002. This averaged 19.7 heaters for each of the 597 employees; one heater for each 7.1 meters (excluding dealer sales).

An analysis of over 100 customer accounts indicated that under normal conditions average consumption per radiant heater in the Atlanta territory is 14.2 M c.f. per heating season. On this basis the campaign added 213,028.4 M c.f. load for the participating companies, which at an average rate of 75 cents per M c.f. would total $159,881.30 in annual revenue.

A highly spectacular plan of campaign was chosen for this radiant heater activity, centering about the use of special display and demonstration trucks operated by uniformed salesmen who were widely advertised as "the house warmers"—this title being selected for campaign publicity.

Bright red and yellow were adopted as campaign colors. Trucks were painted in this scheme, "house warmers" uniforms were in the same bright tones, signs and other display advertising repeated the colors.

There were 16 of the special trucks each manned by four "house warmers" —64 "house warmers" in all. Each truck covered approximately 5000 active meters. In some of the smaller communities the campaign uniform was worn by regular salesmen who canvassed without the truck.

Campaign uniforms consisted of overseas-type red caps with the word "Gasco" embroidered on the side in gold letters; heavy yellow sweaters with the words "house warmer" on back and front in red and an emblem on the left arm "Use Natural Gas—It Costs Less"; red trousers with a wide yellow stripe down each side; yellow shoes with red strings. The complete uniform cost $28.65.

Company trucks of standard light types with regulation pick-up bodies were used. A special frame work and display body were built to standard design by ordinary carpenters or cabinet makers. Each truck carried 15 models of radiant heaters, two of which were hooked up to a cylinder of bottled gas for actual demonstration at the rear of the truck. Demonstrating the heaters at the housewife's front door was highly effective in closing sales.

Cost of constructing special bodies, installing heaters and equipping with bottled gas amounted to about $150 per truck.

Special salesmen were employed as "house warmers" to operate the trucks and canvass house-to-house. Previous gas appliance selling was not required. All employees furnished bonds.

These special salesmen were given one month's preliminary training, plus field training with regular salesmen in radiant heater selling. They were guaranteed $50 a month during the training period. During the campaign they were paid a flat commission of $1.50 per heater sold or prospect sold within 30 days from the date their names were sent in. Small bonuses on other appliances were also paid.

To build interest among non-sales employees and sell them on the magnitude of the activity a three-reel motion picture was made telling the story of the "house warmers" and showing them in action.

A parade through Atlanta and adjoining territory covering a distance of 60 miles opened the campaign, featuring the special demonstration trucks and "house warmers" and installation trucks loaded with radiant heaters, together with a band, display placards, etc. Throughout the campaign a schedule of banquets, daily meetings, semi-weekly circulation of a special bulletin called "No Smoke News", extensive newspaper publicity, and frequent radio broadcasts, was followed. A 15-minute radio program was put on every Monday evening, with two spot announcements daily. The weekly programs were advertised as "The House Warmers" and presented a quartet known to listeners-in as "The Gasco House Warmers." Newspaper copy also featured the "house warmers" in their uniforms, and the special trucks. Housewives were shown at their doors witnessing radiant heater demonstrations.

Novelties in the form of small rubber balloon-type replicas of a "house warmer," in campaign colors, were given to children in the home where heaters were sold. These novelties were in great demand.

Life-size cut-outs of the "house warmers" were used in windows and showrooms, pointing to different types of heaters, and smaller cut-outs were spread generally throughout company departments.

Special life-size cut-outs of a "house warmer" was made of sheet metal mounted on a spike and painted in the special colors. The installation department used these cut-outs on the front lawns of customers' homes while heaters were being installed. These figures carried the sign "Radiant gas heat being installed here."

Campaign prices were based on the company's regular mark-up. They included $4.50 for first floor installation, with an allowance not to exceed 50 feet of pipe; $3.00 additional for second floor installation. Prices ranged from $12.78 to $45.35 for first floor installations and included a carrying charge of 10 per cent per annum. Terms were 25 cents down, balance in nine monthly payments. Special discounts were offered where three or more heaters were purchased, and on these quantity sales terms were extended to 24 months; retail commercial credit service was used before passing credit.

ABOVE: Specially adapted truck and its crew of four "House Warmers," which brought gas radiant heaters to every doorstep in the Atlanta area.

AT LEFT: House Warmers' campaign uniforms were an effective item in the general plan; note also the portable demonstration heater.

"House warmers" were responsible for keeping the display trucks in good condition, driving them at all times, keeping sufficient advertising folders and novelty "house warmers," contracts, etc., on the truck, seeing that prospect cards were available and properly filled out for passing to the regular salesman at the close of each day.

Trucks operated on exact schedule, under the general direction of sales supervisors but under direct supervision of the regular salesman in whose territory the truck was assigned for the day. The entire company territory was covered house-to-house through these trucks. Regular salesmen laid out the territory to be canvassed, supervised and helped close sales.

A truck was spotted on the right side of the street approximately in the center of a group of six homes on either side of the street, within convenient walking distance of all prospects in the group. Two "house warmers" then worked each side of the street, one from each end of the six-home group, and working back to the truck. Each "house warmer" carried a radiant heater equipped with a special strap handle. Every effort was made to bring prospects to the truck for demonstration, and to close sales. Prospects who showed interest but were not closed were followed up promptly by the regular local salesmen.

Personnel of the shop department was increased before the campaign, anticipating volume sales. To keep up with installations 24 local plumbing establishments also installed heaters on a flat price arrangement.

Sales in Atlanta totalled 4,974 heaters and averaged $18.50 per heater, including installation. There were only 293 repossessions and returns in Atlanta between September 18, 1933, and March 1, 1934.

For the four-month campaign in Atlanta the actual cost to the company was $8,167.96, an average of $1.64 per heater, or with dealer sales included, $1.30 per heater. Estimated load added was 89,346 M c.f., an average cost per M c.f. of 9.1 cents, or 12.2 cents per dollar of annual gas revenue, the annual revenue added being estimated at $67,009.50 for the Atlanta company.

Reorganization Plans Advanced for Insull Utilities

Middle West Utilities Co., Chicago, Ill., holding company for Insull gas properties, was ordered lifted from receivership before July 30, by the Federal Court at Chicago. Daniel G. Green has been named temporary trustee. A meeting of creditors and stockholders has been called for August 17, to determine plans for reorganization.

Reorganization plans for the United Public Service Co. and United Public Utilities Co., units of the former Insull group, are under way. Petitions have been filed in the Federal Court in Chicago, under the National Bankruptcy Act, to reorganize the companies in New Jersey under the names of United Public Service Corp. and United Public Utilities Corp.

Pacific Coast Gas Association

Managing Director: Clifford Johnstone
Association Headquarters:
447 Sutter Street, San Francisco

President: George P. Egleston
General Manager, H. R. Basford Co.,
San Francisco

Nominating Committee Completes Work

Late in June, President Geo. P. Egleston appointed a committee whose duty it has been to select candidates for the Association's elective offices for the fiscal year 1935. The committee membership is as follows: John P. Coghlan, vice-president, Pacific Gas and Electric Co., chairman; R. L. Hinckley, president, General Water Heater Corp; H. W. Jackson, general manager, Jas. Graham Manufacturing Co.; Jas. F. Pollard, vice-president and general manager, Seattle Gas Co.; and F. S. Wade, president, Southern Counties Gas Co.

The committee reports that it has unanimously selected the following members for the various offices and will place their names in nomination at the Association's annual meeting at Hotel Del Monte, September 11.

For President: Wm. Moeller, Jr., vice-president, Southern California Gas Co., Los Angeles.

For Vice-President: H. M. Crawford, general sales manager, Pacific Gas and Electric Co., San Francisco.

For Treasurer: D. G. Martin, general auditor, Pacific Gas and Electric Co., San Francisco.

For Directors (2-year term): W J. Bailey, president, Day & Night Water Heater Co., Monrovia; H. L. Farrar, president, Coast Counties Gas and Electric Co., San Francisco; N. R. McKee, vice-president, Southern Counties Gas Co., Los Angeles; Thos. E. Roach, vice-president and general manager, Washington Gas and Electric Co., Tacoma.

For Director (1-year term): B. H. Parkinson, commercial manager, Portland Gas and Coke Co., Portland.

Now Is the Time to Join the Association

New members may join the Association now and by paying dues for the next fiscal year will get full membership privileges for the balance of the present year. Such membership will date from the time of receipt of the application until September 30, 1935. The Association's annual dues are $5.00 for individual memberships, and from those to whom $5.00 looks like a million, the Association will accept $2.50 with the application and the balance on December 1.

This offer also applies to former members who desire to return to the fold now that prosperity is on the way again. For these members the lapse will be forgotten and membership will be dated as of the time of first joining the Association.

Amendment to By-Laws to be Voted on at Convention

AT THE annual meeting which takes place at Del Monte on September 11, the Association's Board of Directors will ask the membership to approve an amendment to Article VII, Section 1, of the Association's By-Laws. This Article now reads as follows:

ARTICLE VII

Dues

SECTION 1. The dues for membership shall be:

Class A Members: Dues shall be paid upon a basis satisfactory to utilities.

Class B Members: Dues shall be fixed annually by the Board of Directors after consultation with the Executive Committee of the Manufacturers' Section. Minimum $25 per year.

Class C Members: $25 per year.

Class D Members: $5 per year.

Class E Members: $2.50 per year.

Class F Members: No Dues.

It is recommended that the above be amended to read as follows:

"The dues for all classes of membership shall be fixed annually by the Board of Directors."

Addison B. Day Medal of Honor

Nominations are now in order for candidates for the Addison B. Day Medal of Honor, the award of which is placed at the disposal of the Association by Addison B. Day, president of the Los Angeles Gas and Electric Corp. The award is made for distinguished service to the gas industry through any endeavor whether it be in engineering, sales, advertising, public relations, or accounting. Any Association member may be nominated by his friends or his company. Nominations may be sent to the Association's office or to President Egleston or Vice-President Moeller.

Committee Reports Due

These are busy days for the 300-odd Association members who are working on committees this year. There are some 45 committees this year distributed among the various Sections, and most of them are expected to complete and turn in their reports within the next three weeks. Several reports have already been received at headquarters. Committee chairmen have been asked to mimeograph their reports, as none will be printed in *Western Gas* prior to the Convention.

Cooperative Advertising

During June the Association's Cooperative Advertising Committee inserted 15 forceful advertisements in as many trade magazines. Each advertisement dealt with some specific use of gas by a satisfied user. Many thousand users and potential users of gas saw one or more of these advertisements and were impressed with the capacity of the gas industry to serve them. During the same month the committee was responsible for the publication of 14 articles about gas and gas users, all appearing in appropriate trade journals read by our customers.

"Gas-ette" Aids in Distribution Dept. Projects for L. A. G. and E.

Publication of "The Gas-ette" is a new activity of the Los Angeles Gas and Electric Corp.'s gas distribution department, of which W. M. Henderson is superintendent. R. C. Terradell is editor, R. V. Davis, associate editor, and (*Western Gas* has it on good authority) W. M. Henderson is staff artist for the attractive bulletin, which comes from the press the first of each month in mimeographed form.

The prime purpose of "The Gas-ette" is to feature sales and service promotional opportunities and accomplishments in the gas distribution department.

Pay Increase For 15,000 Utility Employees in Illinois

Increase in wages and salaries affecting 15,000 workers of The Peoples Gas Light and Coke Co., Commonwealth Edison Co., and Public Service Co. of Northern Illinois, go into effect on August 1. The increases equal one-third the reduction of August 1, 1932. In announcing the increase George A. Ranney, vice-chairman of the three companies, expressed appreciation for the employee loyalty and high service standards maintained in the face of depression conditions. Officers and higher executives of the companies are not affected by the increase.

Gas Service to Be Resumed In North Vancouver

B. C. Electric Power & Gas Co., Vancouver, B. C., is completing plans to make gas service again available to North Vancouver. Negotiations are under way with the Harbour Board which now controls the Second Narrows bridge to lay a pipe line on the structure in a similar way to that agreed upon by the old bridge company. On each end of the lift span of the new bridge the gas company has installed an automatic valve which when the span is lifted and the sleeve joint is disconnected will automatically shut off gas at both the Vancouver end and the North Vancouver end. The valve will also prevent gas from flowing back from the North Vancouver end. The spherical holder at the North Vancouver end of the bridge will handle gas supply while the bridge is open. The valve was designed by F. E. Reed, assistant gas engineer of the company.

About 13 miles of pipe is already laid in North Vancouver city and district, and the B. C. Electric plans further extensions in the area.

To Decide on Ballot for Los Angeles Franchise

ON July 30 the Los Angeles city council was scheduled to take action on a proposed amendment to the city charter which would authorize the council to grant a gas franchise to the Los Angeles Gas and Electric Corp. Although the company has served Los Angeles for the past 67 years under a constitutional franchise similar to those in force in other principal centers of California, suits instituted against the company by the city have eventuated in a ruling from the superior court of Los Angeles county which holds that the rights under the company's constitutional franchise cover distribution of gas for illuminating purposes only. The company has been ordered by the court to secure a gas franchise prior to July, 1935, which will enable it to render all types of gas service.

A proposed charter amendment has been submitted by the company to the city council for submission to the people on the August 28 ballot, which would authorize the council to grant such a franchise, the city to receive upwards of $100,000 annually in additional tax revenues from the company under the proposed franchise.

The Los Angeles Bureau of Power and Light, municipal electric utility, is exerting every effort to make the granting of a gas franchise dependent upon sale of the L. A. G. and E. electric system to the city. Addison B. Day, president and general manager of the gas company, in a statement released late in July, pointed out that the gas franchise should be voted upon separately and apart from any proposal for purchase of the company's electric system. Los Angeles voters in the past have repeatedly declared against acquiring this system.

The gas company has offered the city of Los Angeles a long-term option to purchase its electric system at a fair price, provided the city will grant the company the desired gas franchise.

"Go-Getter" Refrigeration Contest Victors Named

AS *Western Gas* goes to press, word arrives from the American Gas Association Refrigeration Committee of results in the national "Go-Getter" contest among gas utilities marketing Electrolux refrigerators.

The contest was arranged in six divisions in each of which were awarded monetary prizes, Division A receiving $500 for first, $300 and $100 for second and third respectively; and the other five divisions receiving $300 for first, $200 for second, and three prizes of $100 each for third, fourth and fifth. In addition, each division competed for a "Blue Vase" grand award, based upon the blue vase symbol of success in Peter B. Kyne's "Go-Getter" novel.

First place in Division A, which was made up of a selected group of metropolitan companies, went to Southern California Gas Co., Los Angeles. Winners of first place in the other five divisions were: Dallas (Texas) Gas Co.; Metropolitan Utilities District, Omaha, Neb.; Tampa (Fla.) Gas Co.; Tyler (Texas) Gas Service Co.; United Gas Public Service Co., Huntsville, Texas.

San Diego Cons. Gas & Elec. Makes New Accounting Appointments

C. C. Watters has been appointed chief clerk of the accounting department of the San Diego Consolidated Gas & Electric Co., and will serve as special assistant to J. M. Bourus, general auditor of the company. Mr. Watters has been with the San Diego utility since 1927.

W. D. Chambers, for many years with the Byllesby Engineering and Management Co., holding company for the San Diego utility, has been appointed traveling auditor for San Diego Consolidated.

Pacific Lighting Assuming So. Calif. Gas Corp. Bonds

Pacific Lighting Corp. is arranging to assume payment of the Southern California Gas Corp. collateral trust 5 per cent gold bonds of 1937, $11,000,000 face value of the original $25,000,000 issue being in the hands of the public. Assumption of this obligation, together with exchange of certain inter-company securities, will give Pacific Lighting direct ownership of over 99 per cent of the common stock of Southern California Gas Co.

H. T. Brian Supervisor Employee Education, Southern Calif. Gas Co.

H. T. Brian, former industrial salesman in the San Bernardino division of the Southern California Gas Co., has been transferred to the Los Angeles general office as supervisor of employee education. Mr. Brian succeeds W. P. Hand who was made office engineer to Lee Holtz, general superintendent manufacture and distribution.

Washington Gets Deep Well Test

The Northwestern Natural Gas Corp., Seattle, Wash., is sinking a deep well, now at 1700 feet, on the north slope of the Rattlesnake range in Benton County, Wash., near Yakima.

Northwestern Natural Gas Corp., for the past several years has served natural gas to Grandview, Mabton, Prosser, Sunnyside, Granger, Toppenish, and Zillah, Wash., from shallow wells in the Rattlesnake field.

L. A. Company Head Discusses Goodwill Building

In the July, 1934, issue of "Executives Service Bulletin" published by the Metropolitan Life Insurance Co., appears an article by Addison B. Day, president and general manager of the Los Angeles Gas and Electric Corp., entitled "Building Customer Goodwill."

Customer relations, says Mr. Day, may be reduced to a simple formula: First give the customer a square deal; second see that the customer knows he is receiving a square deal. All the rest is detail. The article goes on to describe activities carried on by the Los Angeles Gas and Electric Corp. in the field of employee training and public contacts.

Chicago District Office Opened by "Western Gas"

Western Gas announces the opening of a new district office in Chicago, effective the middle of July, located at 1064 Peoples Gas Building. The office is in charge of Craig Espy, vice-president of the company, and W. G. Russell will also headquarter at the Chicago address.

McMurray on Coast for Dayton

F. A. McMurray, Chicago. Ill., in charge of Dayton pipe coupling sales for National-Superior Co., Toledo, Ohio, was on the Pacific Coast in July, in the interests of his company.

TABLE NO. 4. GAS CONSUMPTION IN M C.F. FOR NORMAL HEATING OF VARIOUS SIZES OF HOUSES

B.T.U. of Gas, 570—Degree Days, 4447

	% of Total	Number of Rooms									
		3	4	5	6	7	8	9	10	12	14
August	....	....	....	....	....	....	....	....	....	....	....
September	2.3	1.9	2.6	3.3	4.1	5.0	5.9	7.0	7.9	10.0	11.6
October	7.5	6.1	8.4	10.8	13.2	16.2	19.1	22.7	25.9	32.5	37.8
November	12.2	10.0	13.7	17.6	21.6	26.3	31.7	36.8	42.1	52 8	61.5
December	16.6	13.6	18.6	24.0	29.4	35.9	42.3	50.1	57.3	71.9	83.7
January	18.0	14.8	20.1	25.9	31.9	38.8	45.9	54.4	62.0	77.9	90.7
February	14.4	11.8	16 1	20.7	25.5	31.1	36.8	43.5	49.7	62.3	72.6
March	12.6	10.3	14.1	18.1	22.3	27.2	32.1	38.0	43.5	54.6	63.5
April	8.9	7.3	10.0	12.8	15.7	19.2	22.7	26.9	30 7	38.5	44.8
May	5.7	4.7	6.4	8.2	10.1	12.3	14.5	17.2	19.7	24.7	28.7
June	1.8	1.5	2.0	2.6	3.2	3.9	4.6	5.4	6.2	7.8	9.1
July	....	....	....	....	....	....	....	....	....	....	....
Total	100	82	112	144	177	216	255	302	345	433	504

TABLE NO. 6. HEAT LOSS CORRECTION FACTORS AFFECTING FUEL CONSUMPTION FOR BUILDING CONSTRUCTION AND OTHER CONDITIONS VARYING FROM NORMAL

If metal weather strip is installed on windows and doors on the exposed or two exposed sides	Minus	7½%
If attic is floored or there is one-half inch of insulation between joists	Minus	6%
If walls are insulated between studding with ½-inch insulation	Minus	10%
If house is of single construction, i.e. has not sheathing behind exterior finish	Plus	9%
If windows and doors are poorly fitting	Plus	10%
For unusual exposure to winds in certain localities such as the heights and the elevated section of Rose City Park	Plus	10%
If installation lacks thermostatic control	Plus	20%

TABLE NO. 5. TEMPERATURE DEFICIENCY BY MONTHS

Percentage of Season—Percentage of Normal

(See Also Fig. 6)

	Normal year		1933-1934			1932-1933			1931-1932			1930-1931			1929-1930		
	Deg. Days (A)	% of Season (B)	Deg. Days (A)	% of Season (B)	% of Normal (C)	Deg. Days (A)	% of Season (B)	% of Normal (C)	Deg. Days (A)	% of Season (B)	% of Normal (C)	Deg. Days (A)	% of Season (B)	% of Normal (C)	Deg. Days (A)	% of Season (B)	% of Normal (C)
August	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
September	100	2.3	167		167	60	1.3	60	109	2.4	109	90	2.3	90	70	1.6	70
October	336	7.5	242		72	269	5.9	80	284	6.4	85	350	8.8	104	203	4.7	60
November	545	12.2	555		102	471	10.3	87	630	14.2	115	570	14.4	104	606	14.0	111
December	738	16.6	570		77	834	18.3	113	769	17.3	104	763	19.2	103	610	14.1	82
January	797	18.0	561		70	775	17.0	97	781	17.5	98	629	15.8	79	1147	26.4	144
February	642	14.4	437		68	750	16.4	118	684	15.4	107	560	14.1	87	524	12.1	82
March	561	12.6	304		54	558	12.2	99	527	11.8	94	502	12.7	90	456	10.5	81
April	394	8.9	177		45	402	8.8	102	354	8.0	90	285	7.2	72	276	6.4	70
May	253	5.7	143		57	344	7.5	136	229	5.1	91	136	3.4	54	310	7.2	124
June	80	1.8				105	2.3	131	85	1.9	106	82	2.1	102	131	3.0	164
July	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
TOTAL	4447	100				4568	100	*103	4452	100	*100	3967	100	*89	4333	100	*97½
Correction Factor	....	....	....	....	....	....	....	1	....	....	1	....	....	1.2	....	....	1

To determine fuel consumption for normal season multiply actual consumption by correction factor bottom line column (C). * Not a total.

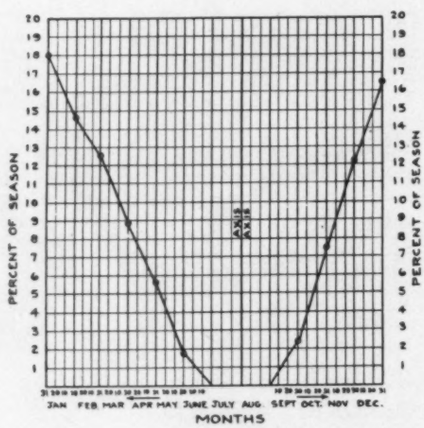


FIG. 6. MONTHLY PERCENTAGE OF SEASON'S HEAT REQUIREMENT.

Normal Year—Normal Month

(See Also Table No. 5)

The percentage of the season's heating requirement of any calendar month is found by following vertical line from the date of the last day of the month at the bottom of the chart to the intersection with the diagonal line, following then horizontally to the left or right border for figure sought.

The percentage of the season's heating requirement for any 30-day period is found similarly except that a starting point is chosen at the bottom of the chart, which represents the date of the last day of the period.

Selling Consumers Real Cost of Gas Househeating

(Continued from Page 13)

(b) Excessive House Temperatures Maintained by Customer

It is not usually realized how a few degrees above 70 would greatly increase the amount of the customer's bill. Fig. 7 shows the effect of such requirements on the consumption of fuel. If, for instance, the home were maintained at 75° F., throughout the heating season instead of 70° F., the bill would increase 37 per cent, or at 80° F.—77 per cent. That such large increases in bills come from small differences in temperature is not readily appreciated by the customers. Such conditions are quite common. Excessive temperatures are not conducive to health and material reductions may be accomplished by restoration of normal conditions.

(c) Poor House Construction and Insulation

Table No. 6 shows correction factors for building construction varying from the normal and likewise the effect of

(d) Lack Of, Or Faulty Thermostatic Control

(e) Careless Operation Of Heating Equipment

It is impossible to give correction factors for this and we must fall back on investigation of customer's habits.

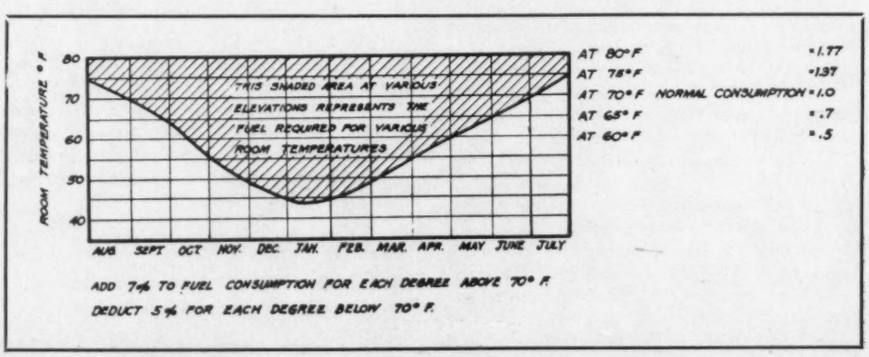

ROOM TEMPERATURE ° F
80
70
60
50
40
THIS SHADED AREA AT VARIOUS ELEVATIONS REPRESENTS THE FUEL REQUIRED FOR VARIOUS ROOM TEMPERATURES
AUG. SEPT. OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY JUNE JULY
AT 80° F = 1.77
AT 75° F = 1.37
AT 70° F NORMAL CONSUMPTION = 1.0
AT 65° F = .7
AT 60° F = .5
ADD 7% TO FUEL CONSUMPTION FOR EACH DEGREE ABOVE 70° F.
DEDUCT 5% FOR EACH DEGREE BELOW 70° F.

Fig. 7. Effect of Room Temperature on Consumption of Fuel for Heating

COMMITTEE:
DOUGLAS BUCKLER...SO. CALIF. GAS CO.
J. EARL JONES.....SEATTLE GAS CO.
A. C. JOY (CHAIRMAN).....P. G. & E.
D. L. SCOTT.....L. A. G. & E. CO.
PIERRE VINET.....C. C. G. & E. CO.

1934 P·C·G·A

HEADQUARTERS:
PACIFIC COAST GAS ASSOCIATION
447 SUTTER STREET, SAN FRANCISCO

GEO. P. EGLESTON, PRESIDENT
CLIFFORD JOHNSTONE, MNG. DIRECTOR

CO-OPERATIVE LOAD-BUILDING MONTHLY NEWS ..... AND VIEWS

COASTWIDE REPRESENTATION

The entire gas industry of the Pacific Coast is represented in our trade journal advertising, appearing regularly in 20 leading industrial and dealer-magazines. Coastwide representation . . . Coastwide coverage . . . Coastwide load building.

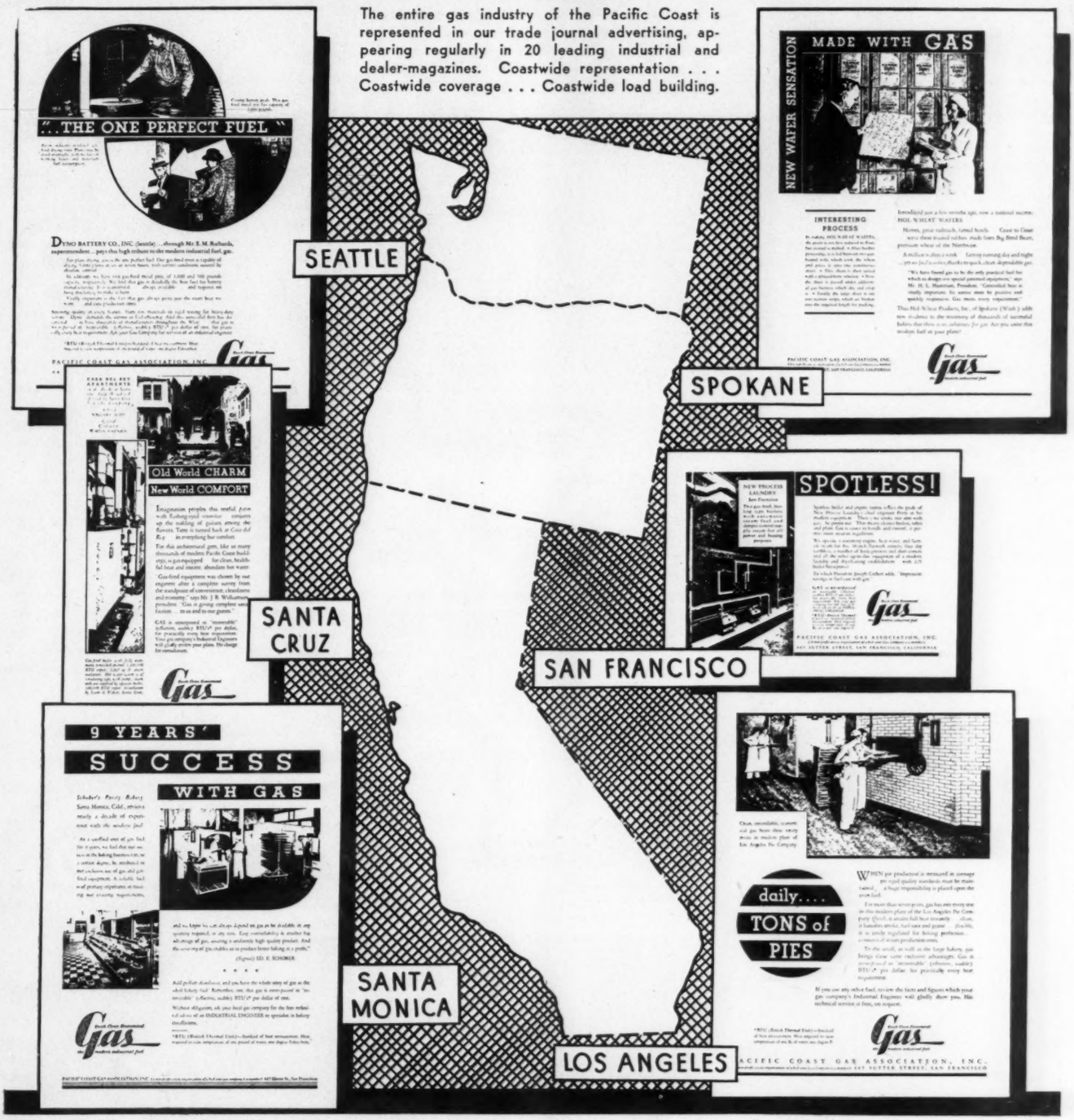


TABLE NO. 7. COST OF GAS HEATING FOR 6 ROOM HOUSE—5000 DEGREE DAY YEAR
(Corrected to 4447 Degree Days)

	CUSTOMER ACCOUNT		CORRECTIONS								NORMAL BILL	
	5000 Deg. Days		TO NORMAL DEGREE DAY		ROOM TEMP. FROM 72° TO 70°		FOR THERMO-STATIC CONTROL		WEATHER STRIP. AND ATTIC INSUL.			
Month	M c.f.	Amt.	M c.f.	Amt.	M c.f.	Amt.	M c.f.	Amt.	M c.f.	Amt.	M c.f.	Amt.
Correction			(4447)		(14%)		(20%)		(13½%)			
August	....	....	....	....	....	....	....	....	....	....	....	....
September	6.2	$ 3.78	7.0	$ 4.08	6.0	$ 3.70	4.8	$ 3.25	4.1	$ 2.98	4.1	$ 2.98
October	23.0	9.55	22.2	9.28	19.1	8.25	15.3	6.98	13.2	6.29	13.2	6.29
November	37.8	14.47	36.4	14.00	31.2	12.27	25.0	10.21	21.6	9.08	21.6	9.08
December	62 4	21.47	49.5	18.36	42.5	16.03	34.0	13.20	29.4	11.68	29.4	11.68
January	81.0	25.89	53.5	19.36	46.0	17.19	37.0	14.20	31.9	12.51	31.9	12.51
February	46.4	17 33	43.0	16.20	36.9	14.17	29.5	11.71	25.5	10.38	25.5	10.38
March	30.4	12.01	37.5	14.37	32.3	12.64	25.8	10.48	22.3	9.34	22.3	9.34
April	18.6	8.08	26.5	10.72	22.8	9.48	18.2	7.95	15.7	7.12	15.7	7.12
May	21.0	8.88	17.0	7.55	14.6	6.45	11.7	5.79	10.1	5.26	10.1	5.26
June	8.7	4.73	5.4	3.48	4.6	3.17	3.7	2.85	3.2	2.64	3.2	2.64
July	....	....	....	....	....	....	....	....	....	....	....	....
TOTAL	335.5	$126.19	298.0	$117.40	256.0	$103.35	205.0	$86.62	177.0	$77.28	177.0	$77.28

The above tables may be applied to the survey of a customer's heating bill in the following manner. This can best be done by means of an example as shown on Table No. 7.

Summarize the effect of the various correction factors and apply the same to the current bill which should then coincide approximately with the so called normal bill for such a sized home. Failure to obtain such a reconciliation shows either incorrect information furnished by the consumer or an improperly designed installation. Generally, where bills can be reconciled by means of the above, to a normal bill, the installation can be assumed to be properly designed, in the absence of specific observations to the contrary. If this cannot be done, it is advisable to make a thorough engineering survey of the installation. Such an inspection may reveal a furnace of inadequate capacity, faulty duct work, or other faulty mechanical shortcomings which may be corrected.

If, however, the customer's bill is normal but he objects to the cost of gas heating as compared to other fuels, then we fall back upon the general presentation of the real cost of gas as compared to other fuels as outlined in the beginning of this paper.

Wyandotte Co. Gas Co. Building New Line Across Kaw River

The Wyandotte County Gas Co., Kansas City, Kan., began construction early in July of a new 16-inch natural gas pipe line over the recently completed 7th Street bridge across the Kaw River in Kansas City, Kan. The new line replaces a 16-inch line laid on the 5th Street bridge in 1904, which will be reclaimed by the company. About 1,000 feet of the 6,000-foot replacement line will be attached to the bridge.

1934 Calendar

August

Southern California Meter Association—Long Beach, Calif., August 22, 1934.

September

Second International Gas Conference, International Gas Union—Zurick, Switzerland, September 1-4.

Wisconsin Utilities Association, Commercial Section—Hotel Pfister, Milwaukee, Wis., September 10-11.

Pacific Coast Gas Association—41st Annual Convention, Hotel Del Monte, Del Monte, Calif., September 11-13.

Midwest Industrial Gas Sales Council—Palmer House, Chicago, Ill., September 21.

October

National Safety Council - American Society of Safety Engineers—Joint Sessions, Cleveland, Statler, Carter and Hollenden Hotels, Cleveland, Ohio, October 1-5.

American Gas Association—16th Annual Convention, Atlantic City, N. J., Week of October 29.

Dallas Gas Co. Announces Personnel Changes

L. A. Bickel, secretary of the Dallas Gas Co., has been named engineer for the company in addition to his title as secretary, effective June 1.

Other changes announced include the appointment of G. W. Martin as safety director and assistant general superintendent to assist R. M. Redding, superintendent. Mr. Martin is also purchasing agent and building manager for the company.

W. F. Parsons, general shop foreman for many years for the Dallas Gas Co., has been made general superintendent of shops. A. D. Stephenson, assistant to Mr. Parsons, was advanced as shop foreman.

Gas Service Co. Starts Annual Summer Heating Campaign

Effective July 1 the new business department of The Gas Service Co. began its annual summer heating campaign. The campaign plans as announced by F. M. Rosenkrans, new business manager, included 15 per cent discount on purchases of furnaces and conversion burners made during July. August purchases will earn a discount of 7½ per cent. A 10 per cent discount was made on unit heaters purchased in July, and a 5 per cent discount is offered on August purchases.

Rudolph Schenck, Oldest Employee of Peoples Gas Light & Coke, Passes

Rudolph Schenck, architect for the Peoples Gas Light and Coke Co., Chicago, Ill., and the oldest employee in the company's service, passed away late in June. He was 73 years old and lacked only a few months of completing a half century of service with the company.

Mr. Schenck was born in Rappenau, Germany, in 1861, and was educated in the technical university of Stuttgart. He came to America in 1881, and entered the employ of the gas company three years later. He was the inventor of several devices and processes widely used in gas manufacture, and the author of a number of technical works. He designed practically all of the Peoples Gas Light and Coke Co. buildings during the past 40 years.

C. N. Robinson Made Vice-President Public Service Co. of Oklahoma

Fred W. Insull, president of the Public Service Company of Oklahoma, Tulsa, Okla., has announced the appointment of C. N. Robinson as vice-president in charge of new business for the company. Mr. Robinson has been connected with the Insull properties for 14 years, and comes direct to the Oklahoma utility from the Central Illinois Public Service Co. of Springfield, Ill.

So. Calif. Gas Co. Opens New Office

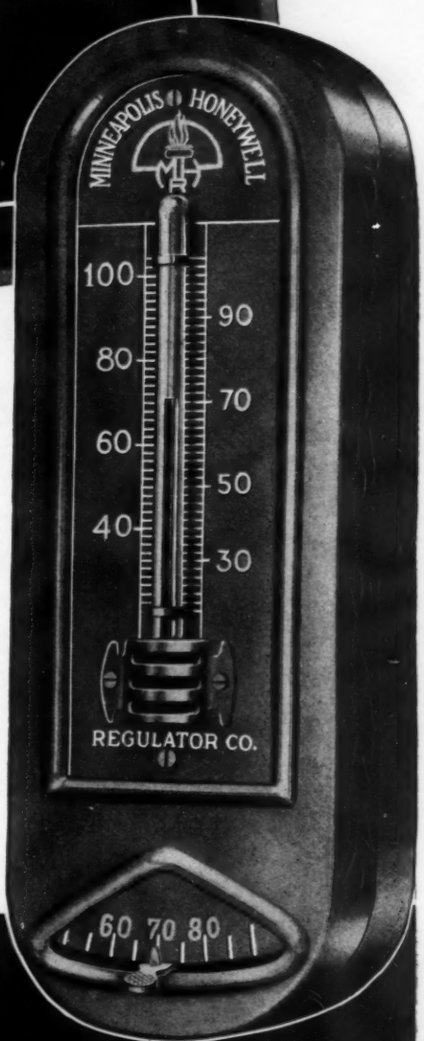
The Southern California Gas Co., Los Angeles, announces the opening of a new office in Gardena, Calif., early in July. Gardena is in the Redondo division of the company, under the supervision of J. Murray, division manager.

NOW

THE NEW MINNEAPOLIS-HONEYWELL

HEAT ACCELERATED THERMOSTAT

Maintains Even Temperature And Prevents Wasteful Overheating

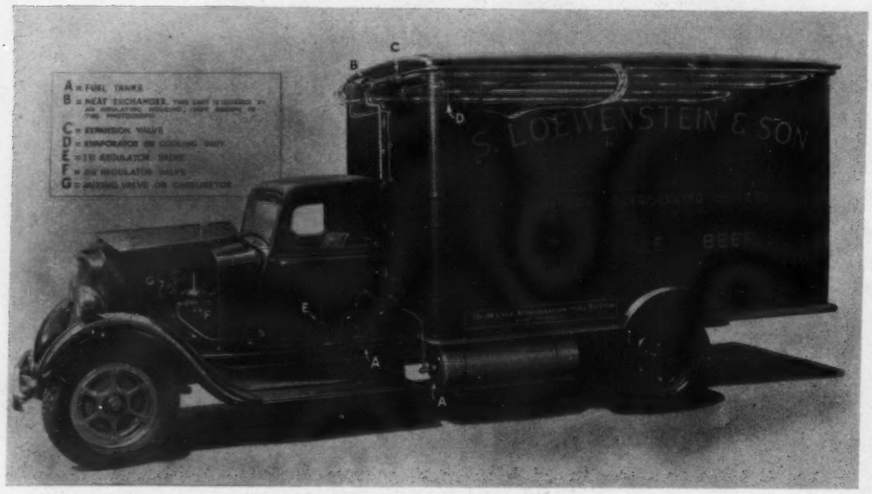


THE new Heat Accelerated Thermostat, an exclusive Minneapolis-Honeywell achievement, speeds up thermostatic action at precisely the proper time and makes possible finer and more accurate control for gas burners. It maintains even temperature and prevents overheating . . . This accurate and efficient control is possible through use of the Minneapolis-Honeywell Series 10 principle. As with all other M-H thermostats, control is maintained from the common sense breathing level height . . . To improve your gas burner efficiency, investigate the new Minneapolis-Honeywell Heat Accelerated Thermostat . . . Minneapolis-Honeywell Regulator Co., 401 East Twenty-eight St., Minneapolis, Minnesota. Branch and distributing offices in all principal cities.

MINNEAPOLIS HONEYWELL . . . CONTROL SYSTEMS

BUTANE • PROPANE NEWS

Vol. 4, No. 8 August, 1934


A = FUEL TANKS
B = HEAT EXCHANGER
C = EXPANSION VALVE
D = EVAPORATOR OR COOLING UNIT
E = LOW REGULATOR VALVE
F = HIGH REGULATOR VALVE
G = MIXING VALVE OR CARBURETOR
S. LOEWENSTEIN & SON

This 2-ton Dodge truck is operating on regular run in the Detroit area, a liquefied petroleum gas product supplying fuel for motive power and also acting as refrigerant for the meat products transported.

Fuel-Refrigeration System for Trucks Now on Production

USE of liquefied petroleum gases as a combination refrigerating and motor fuel medium in commercial refrigerator trucks has been in a development stage for the past year and a half, and practical equipment is now being put into service which should rapidly extend the market for these products. The original experiments were carried on by the Shell Oil Co., on the Pacific Coast, following which the Shell Union Oil Co. took the project in charge. By recent agreement with the latter company the McCord Radiator & Mfg. Co. of Detroit, Mich., has been exclusively licensed in the United States to manufacture and sell the system, in which Petrogas, liquefied petroleum gas product supplied by Shell Petroleum Co., is used as fuel and refrigerant.

Guy L. Tinkham of the McCord company gives *Butane-Propane News* the following report upon the system, including results of tests made under operating conditions on a Petrogas-equipped meat truck in the Detroit area.

The 2-ton Dodge truck (size of refrigerating compartment 6 x 6 x 11 feet) in the service of S. Loewenstein & Son, packers, Detroit, shown in the above photograph, was one of the first trucks to be equipped with this system east of the Rockies. By referring to the photograph it will be seen that the fuel, carried as a liquid at a pressure of 135 pounds in the twin cylinders, "A", each containing approximately 23 gallons, is led upwards to the heat exchanger, "B", where the atmospheric heat of the liquid is removed. It then passes through the expansion valve, "C", from which it issues into the evaporator or cooling unit, "D", as a saturated gas at a pressure of approximately 5 pounds. In its conversion from a liquid to a gas, heat absorption is effected and the truck body thereby refrigerated. The surface of the evaporator is so proportioned that the gas leaves in a perfectly dry state and passes through the heat exchanger, "B", where it absorbs the atmospheric heat of the incoming liquid fuel as above mentioned, and then passes through the diaphragm regulating valves, "E" and "F", where, in two stages the pressure is reduced to atmospheric. The dry gas then passes to the McCord mixing valve and thence directly to the intake manifold.

The advantages of Petrogas in its dual role of fuel and refrigerant are many. Considered as a fuel alone, it is economical since it is marketed at approximately the same price, on a performance basis, as regular gasoline, and yet is superior to gasoline in operating characteristics. It is further economical in that its use results in the total elimination of crank-case lubricating oil dilution, thus effecting a saving of approximately 50 per cent in oil costs.

Being a perfectly dry and homogeneous gas when it enters the manifold, even distribution to each cylinder is assured and the "hot spot" can be dispensed with, thereby permitting a less expanded charge of gas to be drawn into the cylinders than in the case of a gasoline-air mixture. As this fuel has a final boiling point of 40° below zero F., and becomes a dry gas at higher temperatures, motor starting is never dependent upon a change in mixture.

Having an extremely high octane rating, it can be used advantageously on high compression motors, and with motors of ordinary compression higher efficiency is obtainable through its improved combustion. This, in turn, is a decided factor in reducing maintenance costs, as it is now known that the wear on cylinder walls and on valves is less due to abrasion than to chemical deterioration of the metal caused by incomplete combustion.

The advantages of this type of gas as a refrigerant are obvious, since the refrigeration effect is obtained as a by-product and at no cost whatever. Maintenance cost in the system is reduced to a minimum as there are only a few valves to consider and no moving parts.

It should be noted in connection with this system that the amount of refrigeration which is created is in direct proportion to the quantity of fuel consumed by the motor and is equivalent to 180-185 B.t.u.'s per pound of fuel.

On runs where the motor is under load or partial load for the greater part of the time, an excess of refrigeration may be produced, but such excess may be controlled thermostatically in a simple matter. On runs where many stops are made, where the doors of the refrigerator compartment are opened a number of times, and where the motor is idle for long periods, the refigeration is still adequate as will be seen from the following performance chart of the Loewenstein truck on June 4, 1934—a typical record:

Date of Test—June 4, 1934

Truck left Wayne	11:10 a. m.
Truck returned warehouse	6:00 p. m.
Elapsed time	410 minutes
Engine idle	130 minutes or 31%
Engine under load	280 minutes or 69%
Number of stops made	16
Miles traveled	120
Load carried	5,261 pounds

Hourly Temperatures

Time	U. S. Report*	Refrig. Body
11:00 a.m.	85 Deg.	48 Deg.
12:00 Noon	90 Deg.	42 Deg.
1:00 p.m.	91 Deg.	44 Deg.
2:00 p.m.	92 Deg.	46 Deg.
3:00 p.m.	94 Deg.	46 Deg.
4:00 p.m.	94 Deg.	46 Deg.
5:00 p.m.	93 Deg.	42 Deg.
		(Truck empty here)
6:00 p.m.	89 Deg.	44 Deg.

*These reports were taken from the top of the Majestic Building in Detroit, and the figures are believed to be from 7° to 10° lower than the temperature at the street level.

Phillips Pet. Takes Over Philgas Wholesale and Tank-Car Divisions

Effective June 1, all divisions of Philgas Co., with the exception of the Philgas Division, were incorporated, through purchase, into the Phillips Petroleum Co., the parent organization. The divisions so affected, and now operating under the Phillips newly created "Liquefied Gas Department," comprise those handling tank-car sales for wholesale, industrial and gas-manufacturing purposes. The management, offices, personnel and policies will remain the same under the new name.

The Philgas Division, handling retail sales and the charging of cylinders for such wholesale accounts as do not make tank-car purchases, will continue to use the Philgas Co. name.

Lone Star Gas Co. Appoints Stargas Dealers

The Sherrod Bros. Hardware Co., Lubbock, Texas, has been appointed by the Lone Star Gas Co.'s Stargas Department to distribute Stargas in Bailey, Cochran, Crosby, Dawson, Floyd, Gaines, Garza, Hale, Hockley, Lamb, Lubbock, Lynn, Terry and Yoakum counties of Texas. L. K. Haines Co., Houston, Texas, will distribute the liquefied petroleum gas product in Harris County; and McCulloch County will be served through the Gartman Music Co., Brady, Texas.

Argentine Executive Inspecting U. S. Liquefied Gas Industry

Enrique V. Plate, sales manager of the Argentine Government Oil Fields, is making a tour of the United States to study the marketing and production methods of the liquefied petroleum gas industry. The Argentine government, through its own agency, recently began retail distribution of bottled gas in Buenos Aires, Argentine, S.A.

OUTNUMBERING THE FIELD

Hackney Liquefied Petroleum Gas Cylinders are twice as popular as all others combined.

In the liquefied petroleum gas field there are *two* Hackney cylinders in service to every one of *all others combined.*

Hackney cylinders are chosen by: Phillips, Skelly, Shell, Standard, and other leaders.

This popularity has been won by superior design and workmanship — made possible by the long experience and extensive manufacturing facilities of Pressed Steel Tank Company — builders of metal containers for the country's leading users.

PRESSED STEEL TANK COMPANY
208 S. La Salle St. Bldg., Room 1185, Chicago, Ill.
1363 Vanderbilt Concourse Bldg., New York, N. Y.
6633 Greenfield Ave., Milwaukee, Wis.
666 Roosevelt Bldg., Los Angeles, Calif.

Hackney
MILWAUKEE

CONTAINERS FOR GASES, LIQUIDS AND SOLIDS

Safety Subjects Featured in New Philgas Publication

As an essential part of its current safety campaign, Philgas Co., Detroit, Mich., has issued a booklet (Memo B-32-34) entitled "Safety Devices for Liquefied Petroleum Gas Storage Installations." In publishing the booklet the company's aim is to assist in bringing older installations up to current high standards through cooperation with owners and users of equipment. The booklet calls attention to the revised safety regulations issued by the National Board of Fire Underwriters in Pamphlet No. 58, and presents pertinent information on application of these regulations to specific storage tanks. List of equipment required, methods of emptying and purging storage tanks, checking and testing relief valves, together with supplementary data on heat exchanger relief valves, tank car and storage tank repressure connections, regulator relief valves and protection of liquid lines against hydrostatic pressure, are among the subjects covered in the book. G. L. Brennan is in charge of the Philgas safety program.

Cleaning So. Calif. Kettleman Line

Southern California Gas Co. is cleaning a 20-mile section of its 20-inch line at Kettleman Hills, in which intense corrosion has reduced capacity and occasioned stoppage at some points.

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VALVES,
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CAPACITIES TO MEET CUSTOMERS REQUIREMENTS

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WM. B. SCAIFE & SONS CO.
OAKMONT, PENNA.
NEW YORK PITTSBURGH CHICAGO

Pacific Gas Co., S. A., Organized to Distribute Bottled Gas in Lima

ORGANIZATION of the Pacific Gas Co., S.A., Lima, Peru, for the distribution of bottled gas to customers in that area, is being completed by a syndicate composed of Messrs. Claude E. Guyant, William E. Esplin, Andres Dasso, John T. Glidden, and Manuel de las Casas.

Lima has a population of approximately 400,000 and is the largest city in the western hemisphere without gas service of any kind. The company expects to extend its activities to other centers of population in Peru, Ecuador and Chile, when development of the Lima area has been completed.

It is the plan of the Pacific Gas Co., S.A., to purchase liquid gas from the International Petroleum Co. of Talara and Negritos, which will extract butane-propane from natural gas in the Talara oil field, building a plant for this purpose. Gas will be distributed in steel cylinders containing 60 to 100 pounds of the product, under pressure of 125 pounds to the square inch. Cost of the gas to Lima consumers would be between 40 and 48 centavos per pound.

The Pacific Gas Co., S.A., expects to merchandise a full line of ranges, refrigerators, lighting equipment, water heaters, etc.

Paige To Represent A. G. A. At Zurich Conference

CLIFFORD E. PAIGE, past president of the American Gas Association, will represent the Association at the Second International Gas Conference of the International Gas Union, at Zurich, Switzerland, September 1-4. Mr. Paige, who is vice-president of The Brooklyn Union Gas Co., Brooklyn, N. Y., is also a vice-president of the International Gas Union. He will deliver a paper on "Developments from Coordinated Research and Coordinated Rate Making" at the Conference.

Reports on the following subjects will be presented: Coordination of Testing Methods in Gas Production—Germany; Methods for Developing Industrial Use of Gas, including the Hotel Industry—Belgium; Coordination of Methods of Testing Gas Appliances—France; Methods for Developing Use of Gas for Domestic Purposes—Great Britain; Installations—Switzerland; Systems of Gas Charges—Czecho-Slovakia.

Western Gas Co. Adds Electric Power Plant and Tempe to System

Western Gas Co., El Paso, Texas, will extend its line serving Phoenix, Ariz., to the steam electric plant of the Central Arizona Light and Power Co., according to D. H. Tucker, Arizona state manager of the company.

Western Gas Co., has also obtained right-of-way to extend the pipe line to Tempe, Ariz., work to start at once.

Liquefied Gas for Panama City

According to W. H. Cashwell of the Panama Gas Co., Panama City, Fla., this company is organizing an enterprise to furnish bottled gas to the territory immediately adjacent to Panama City.

Oregon Nat. Gas. Corp. Plant Sold at Coquille, Oregon

Franchise, properties and equipment of the Oregon Natural Gas Corp., at Coquille, Ore., were sold June 28 to stockholders in the newly formed Coquille Gas & Power Co. Operating personnel for the new corporation has not been named. The Coquille plant was originally built by Natural Gas Corp. of Oregon, subsidiary of Standard Oil Co., San Francisco, in 1929 at a cost of about $100,000.

Stockholders of the Coquille Gas & Power Co. include Geo. A. Ulett, R. A. Jeub, J. Arthur Berg, Dr. C. A. Rietman, Lafe Compton and Dr. James Richmond, all of Coquille.

Sunbright Pipe Line Co. Given 90-Day Permit

The Sunbright Pipe Line Co., Sunbright, Tenn., has been granted a 90-day temporary certificate by the Tennessee Utilities Commission, permitting the company to begin preliminary work on the construction of a natural gas pipe line from the Sunbright fields in Morgan County to Knoxville, Tenn., touching Wartburg, Harriman, Kingston and Lenoir City en route.

The Sunbright Pipe Line Co. is a subsidiary of the Public Service Corp. of Tennessee, Sunbright.

Bowdoin Utilities Building Steel Structure to House Compressors

Bowdoin Utilities Co., Minneapolis, Minn., is planning construction of a 35- by 70-foot steel structure to house compressor equipment, according to James Phillips, manager of the company's district office at Glasgow, Mont. Construction is to begin immediately and will be in charge of A. M. Lockwood, plant construction engineer. The station, which will house three compressors, will be located about 4 miles east of Saco, Mont.

Detroit Vapor Stove Co. Has New Catalog

The Detroit (Mich.) Vapor Stove Co. has just brought from the presses its Catalog No. 34. Tests on the company's line of gas ranges by the Goodhousekeeping Institute are described and illustrated, as is also construction details of the line of Detroit Vapor gas ranges. With Catalog No. 34 are included illustrations in color of the company's series 1500-1800 models and Nos. 1617, 1607, 1117 and 1007.

Maryland Firm Head Dies

J. T. Hays, senior member of the firm of J. T. Hays & Sons, bottled gas distributors, with offices at Emmittsburg, Md., died recently, after five or six years in the business. The firm will be continued by his sons.

Plans New Dinuba Building

Preparations are being made by Southern California Gas Co., Los Angeles, to erect a new office building at Dinuba, Calif.

Lone Star Gas Co. Features Essay Contest on Gas Kitchen

TO spotlight public attention on three essential gas appliances, the gas refrigerator, automatic gas range, and the automatic gas water heater, the Lone Star Gas Co., Dallas. Texas, on June 1 inaugurated an essay contest on "Why I Like a Modern Gas Kitchen" for customers on the company's system.

Gas appliances totaling $1,500 were offered as prizes. An automatic gas range, an air-cooled Electrolux gas refrigerator, and an automatic water heater are to be awarded the first prize-winner. Second prize is an air-cooled Electrolux; third, fourth and fifth prizes, modern gas ranges; sixth, seventh, eighth and ninth prizes, modern automatic gas water heaters, and the tenth prize a 10-radiant room heater. In addition to the major prizes 40 small room heaters were offered authors of letters receiving honorable mention.

The contest was announced late in May through broadsides distributed by the Dallas Gas Co., Community Natural Gas Co., Lone Star Gas Co., Texas Cities Gas Co., Municipal Gas Co., Stamford & Western Gas Co., and County Gas Co., subsidiaries of Lone Star. Newspaper advertising also featured the contest, and posters were on display throughout the entire system.

Judges for the contest, representing three large Texas colleges, were to meet late in July to make final awards.

W. P. Hutchinson, President, Sprague Meter Co. on Coast in July

W. P. Hutchinson

W. P. HUTCHINSON, president of the Sprague Meter Co. of Bridgeport, Conn., during the month of July made a visit to the Pacific Coast, contacting natural gas properties in the interest of his company. Mr. Hutchinson reported a substantial increase in sales for the Sprague Meter Co. for 1934, particularly on the Pacific Coast, where E. H. Roseberry is in charge for the company.

New Gas Rate and Water Heating Plan for B. C. Electric

A new rate for gas water heating and a new rental-purchase plan for automatic gas water heaters has been announced by the British Columbia Electric Railway Co., Ltd., Vancouver, B. C., Canada. A rate of 75 cents per 1000 cubic feet, on a separate meter, subject to a minimum charge of $2.50 a month is available to users of gas water heaters.

The rental plan provides for installation of automatic gas water heaters on a monthly rental basis of from $1.50 to $2.50 a month, plus the cost of gas service. At the end of a period, the length of which will depend upon the cost of the heater, these rental payments cease and the heater becomes the property of the purchaser.

Merco Nordstrom Issues New Bulletin

Bulletin No. V-102 has just been issued by Merco Nordstrom Valve Co., illustrating the adaptation of the Nordstrom lubricated plug valve to gate valve dimensions. The Emco-Nordstrom Valve is available in all sixes from 2 to 12 inches, to permit installation where gate valves of the same dimensions have been installed.

Illustrations, blue-prints and specifications covering different types for various working pressures are included in the new bulletin. Flanged and screwed valves are shown; also types for worm gear and wrench operation.

Copies of Bulletin V-102 may be obtained by addressing Merco Nordstrom Valve Co., 400 Lexington, Homewood, Pittsburgh, Pa., or Oakland, Calif.

Minnesota Valley Natural Gas Co. Incorporates at St. Peter, Minn.

The Minnesota Valley Natural Gas Co., St. Peter, Minn., has been incorporated. with a capital stock of $16,000. The incorporators are R. C. Crawford, Pittsburgh, Pa., president; C. B. Cassell, Dallas, Texas, vice-president and general manager, and W. Crawford, Pittsburgh, Pa.

General headquarter offices for the company, to be in charge of Mr. Cassell, will be opened in St. Peter early in August. E. D. Clutter, Pittsburgh, Pa., will supervise installation of the company's distribution system in St. Peter, Le Sueur, Le Center, New Prague and Montgomery, Minn., completion of which is expected by October. It is planned to add other towns to the system later.

7 Per Cent Held Adequate Return By Oklahoma Court

The Oklahoma Supreme Court has handed down a decision upholding the Oklahoma Corporation Commission's opinion that 7 per cent is adequate earning for gas utilities during times of depression. The Consolidated Gas Service Co., Oklahoma City, Okla., had appealed to the Supreme Court against an order of the Corporation Commission directing a reduction in the rates for natural gas charged at the city gates of Mangum and Granite, Okla.

Indiana Utilities Required to Report Monthly to Public Service Commission

A blanket order issued recently by the Indiana Public Service Commission, affecting some 200 companies, requires all utilities to submit monthly reports, giving detailed information on earnings, expenditures, property improvements, transactions with affiliated companies, listing names of stockholders, officers, directors, and including investment and other financial structure details. Hitherto it has been necessary for utilities to report to the Commission only once a year.

Inspector For Montana Commission

Geo. F. Burke has been appointed oil and gas inspector for the Montana Public Service Commission, to succeed Bruce P. Radigan, who has resigned.

HIGH QUALITY—LOW PRICE

AGP

AUTOMATIC STORAGE GAS WATER HEATERS

Three models of quality water heaters at a price range to meet any campaign requirement. Each combines the highest efficiency with improved principles of design and sturdy construction. Perfectly controlled, highly efficient, yet lowest in price for comparable quality.

A. G. P. made in galvanized or Everdur tanks—20-25-30-40-75 gallon sizes.

A. G. P. SPECIAL made in galvanized tanks—20-25-30-40-75 gallon sizes.

THE DICTATOR Low-Priced Water Heater is made in galvanized or Everdur tanks—15-20-30-40 gallon sizes.

Write for Literature

AMERICAN GAS PRODUCTS CORPORATION

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AMERICAN RADIATOR COMPANY

BUTANE

Fuel of the Future

BUTANE is an efficient, economical substitute for manufactured gas, natural gas, and electricity for domestic and industrial uses, including heat-treating, cutting, welding, refrigerating. The perfect fuel for rail motor cars, busses, trucks, stationary engines.

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When Should Idle Gas Meters Be Removed?

By H. L. GAIDRY

Chief Engineer Gas Department
*New Orleans Public Service Inc.**

ONE of the important problems confronting the operating division of a utility is, the determination of when idle gas and electric meters should be removed.

If it were true that all cut-out accounts would not be followed by reconnections before the time when the fixed charges, turn-off, turn-on, and reading expenses of the idle meters, equaled their removal, repair and resetting costs, all meters could be removed at the time of their cut-outs, with no possibility of saving or loss to the company.

In general, such a hypothesis is incorrect, for the majority of premises whose occupants have discontinued service are reconnected before the charges are equalized. It, therefore, follows that at each dwelling where a meter is reset before the equalization of the charges, the operating company would have saved money by allowing the original meter to remain idle on the premises, and buying another meter to be used at another location during the original meter's idle period.

The total amount of available saving will depend on the costs involved and time interval between cut-outs and turn-ons of all meters.

With the exception of a few isolated cases, it is virtually impossible to individually predict when a dead account wil be reopened. However, it is possible to study the history of past accounts, and set up hypothetical figures that will serve as a guide for future practices.

For the past year records have been kept of the "in-tests" of removed meters, classified as to their periods of idleness.

The summation of these records show that 85.2 per cent of the meters which have been idle for periods of from four to nine months are within the limits of accuracy.

During the year 1933, 3645 meters were tested on the consumers' premises, at the request of the consumers. Of these 3645 meters, 92.8 per cent were found to be within the limits of accuracy.

Assuming that 92.8 per cent is a fair ratio for all of the active meters on the system, it would seem that (92.8 − 85.2 = 7.6 per cent) of the locked out meters have gone out of

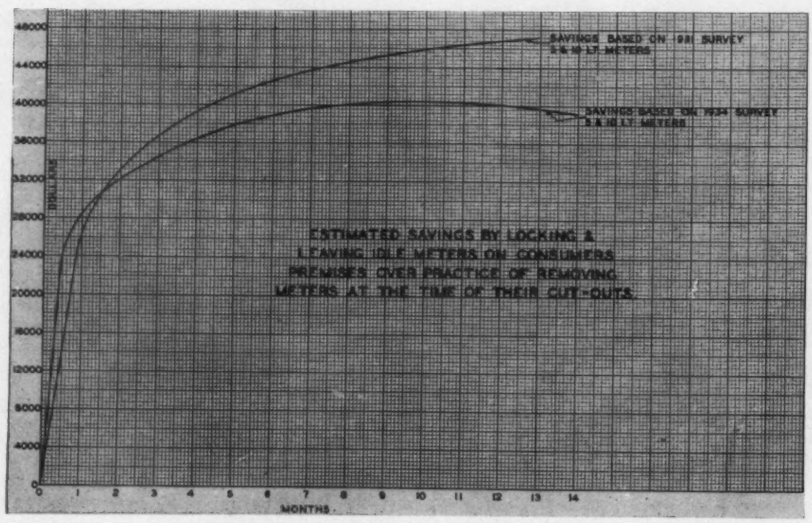

SAVINGS BASED ON 1931 SURVEY
5 & 10 LT. METERS
SAVINGS BASED ON 1934 SURVEY
5 & 10 LT. METERS
DOLLARS
ESTIMATED SAVINGS BY LOCKING & LEAVING IDLE METERS ON CONSUMERS PREMISES OVER PRACTICE OF REMOVING METERS AT THE TIME OF THEIR CUT-OUTS.
MONTHS

Fig. 1.

* Excerpts from a paper presented to the 11th Annual Distribution Conference of the American Gas Association, held at Detroit, Mich., April 9, 1934. The original title of Mr. Gaidry's paper was "Removing and Resetting Meters and Turn On and Turn Off Expense."

TABLE NO. 1. ECONOMICS OF LOCKED OUT METERS; 5 AND 10 LIGHT METERS.
Based on Survey of November 11, 1931—1933 Cost Figures Used

Condition	Left on Consumers' Premises	(1) Locked-Out Meters Cut Back Into Original Service	(2) Locked-Out Meters Removed	(3) Locked-Out Meters Removed Less Those Not Reset	(4) Cost of Locking-Out Meters	(5) Cost of Turning On Locked-Out Meters	(6 Cost of Removing—Testing, Repairing and Resetting Locked-Out Meters	(7) Sum of (4) to (6) Inclusive Sub-Total Per 1000 Meters	(8) (7) x 29,000 Meters Cut Out Per Year. Sub-Total on Annual Basis	(9) Average Number Locked-Out Meters on Consumers' Premises	(10) Based on (9) Annual Cost of Reading Locked-Out Meters	(11) Based on (9) Annual Fixed Charges on Average Locked-Out Meters	(12) Total Annual Costs	(13) Savings Annually
1	0 Months	.....	1000	.....	.....	.....	$2,644	$2,644	$76,676	.....	.....	.....	$76.676	.....
2	1 "	565	435	.....	$227	$147	1,150	1 524	44.196	2.737	$ 679	$ 5.173	50.048	$26.628
3	2 "	702	298	.....	227	183	788	1,198	34,742	3,927	974	7,422	43.138	33,538
4	3 "	775	225	.....	227	202	595	1,024	29,696	4,743	1,176	8 964	39.836	36.840
5	4 "	826	174	.....	227	215	460	902	26.158	5,358	1,329	10.127	37.614	39 062
6	5 "	867	133	.....	227	225	352	804	23,316	5,835	1,447	11.028	35,791	40,885
7	6 "	905	95	.....	227	235	253	715	20 735	6,199	1,537	11.716	33.988	42,688
8	7 "	927	73	.....	227	241	193	661	19.169	6,459	1,602	12.208	32.979	43,697
9	8 "	946	54	.....	227	246	143	616	17,864	6.658	1,651	12.584	32,099	44.577
10	9 "	962	38	.....	227	250	101	578	16 762	6,807	1,688	12.865	31,315	45.361
11	10 "	971	29	.....	227	252	77	556	16,124	6.910	1,714	13,060	30,898	45,778
12	11 "	979	21	.....	227	255	56	538	15.602	6.989	1.733	13.209	30.544	46 132
13	12 "	988	12	.....	227	257	32	516	14,964	7,047	1,748	13,319	30,031	46.645
14	13 "	1000	....	.....	227	260	....	487	14,123	7,080	1,756	13,381	29,280	47,416

NOW as always

PITTSBURG WATER HEATERS

SELL!

Year after year, through good times and bad, this nationally famous line goes on building up profitable business for the gas industry and the plumber o Today the need for Pittsburg water heaters is more emphatic than ever o A modern hot water supply has become an essential in American living—but operating costs are closely studied o The dollars-and-cents efficiency of Pittsburg heaters is, under these conditions, your strongest sales argument

Pioneer in the gas water heater field, Pittsburg presents a record of uninterrupted leadership, attested by the unrivalled breadth of its line, the prestige of its name, the alertness of its engineers to the needs of today—and tomorrow

There is a Pittsburg water heater to meet every conceivable requirement, whether large-volume or small

PITTSBURG WATER HEATER COMPANY

FACTORY AND GENERAL OFFICE: PITTSBURGH, PA.

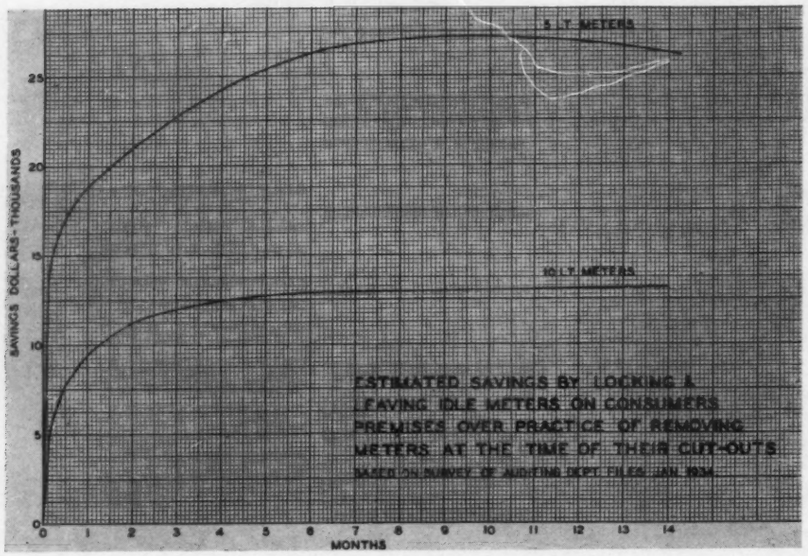

5 LT METERS
10 LT METERS
SAVINGS DOLLARS - THOUSANDS
MONTHS
ESTIMATED SAVINGS BY LOCKING &
LEAVING IDLE METERS ON CONSUMERS
PREMISES OVER PRACTICE OF REMOVING
METERS AT THE TIME OF THEIR CUT-OUTS
BASED ON SURVEY OF AUDITING DEPT FILES JAN 1932

Fig. 2.

proof after being locked out and remaining idle. One of the contributing factors to the loss of proof is probably idleness bringing about a change of friction in the packing boxes, and the loss or gain in friction between the valve covers and the seats.

While no intensive tests along these lines have as yet been made, it is believed that in the majority of cases, the meter tends to resume the proof it originally possessed before its cut-out, after it has been cut back into active service.

A very small portion (less than 1 per cent) of the locked out meters removed, will not pass gas. In the majority of these cases, this condition is brought about by sticking of the valves, causing the flag arm to become out of division by turning on the flag rod.

Another circumstance that no doubt influences the proof of the idle meters, is that some of them are exposed to the air, by virtue of the fact that customers sometimes request that their service be discontinued before they leave the premises. If care is not taken by their plumber to see that all outlets are plugged or capped, air eventually diffuses with/and displaces the gas in the fuel lines and meters. This sometimes causes a change in the friction of the moving parts of the meter, a stiffening of the diaphragms, or both.

Probably the worst effect of the air is to bring about intensive corrosive conditions on the interior parts of the meters. An attempt is being made to combat this condition by application of a rust preventive compound to those parts most likely to be affected. Such treatment has affected the unit shop repair cost to a very minor degree.

All things considered, it is not believed that the difficulties encountered in leaving locked out meters on the premises for periods up to 15 months, are sufficient to cause alteration of the present practices.

From 1923 to 1931, this company experienced an increase in the number of active domestic gas meters of about 4 per cent per year.

In November, 1931, the first study of the idle meter situation was completed, the results of which are shown in Table No. 1, and plotted on Fig. 1.

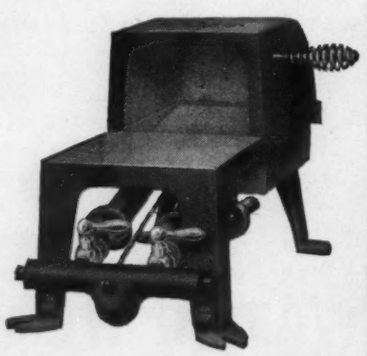
The survey was made by noting the periods existing between the cut out and reconnect dates of 1000 meter cards, indiscriminately withdrawn from the auditing department files.

JOHNSON NO. 502
AN EFFICIENT, LOW PRICED
BENCH FURNACE

Learn about this sturdy bench furnace. Low in cost, efficient, dependable. Ideal for heating soldering coppers and general shop use. Two Johnson Bunsen Burners provide quick, intense heat without forced air blast. Write for our complete catalog.

JOHNSON GAS APPLIANCE CO.
Cedar Rapids IOWA

Pacific Coast Representative—C. B. Babcock Co.
135 Bluxome St., San Francisco, Calif.



The results show that of the 1000 meters cut out, all were cut back into service at the end of 13 months. Their periods of idleness are indicated by column 1 of Table No. 1, which shows the number of meters cut back into service in the months indicated.

The costs per thousand meters were corrected to the total number of meters cut out per year, and were computed for 14 different sets of conditions.

Condition 1 assumed that all meters were removed at the time that the customer discontinued the use of gas.

Condition 2 was based on leaving all meters on the premises one month before removing them; Condition 3, two months, etc.

The savings indicated are derived by deducting the cost of each set of conditions from Condition 1.

Any two conditions may, of course, be compared in order to determine the savings effected between different removal periods.

All costs used are present day figures on 5 lt. meters so that the savings indicated are those that would be possible under present conditions, were the reconnect trend at the present time the same as when the survey was made.

Reference to Fig. 1 shows that the greatest saving is obtained when meters are allowed to remain idle for 13 months before removing, for the greater portion of them will have been cut back into service before this period has expired.

During the year of 1932, the active domestic gas accounts of the company suffered a decrease of approximately 3 per cent. In view of this decrease and the uncertainty of business, the management decided to disregard the results indicated by the 1931 study, and to remove meters as the demand required, down to the three months period, if necessary.

The result of this policy was that 5 lt. meters were removed down to as low as those in the seven months idle period, and 10 lts. down to four.

The wisdom of the decision is clearly exemplified by the survey recently made in January of this year.

The survey was made in the same manner as the original, except that 1000—5 lt. and 1000—10 lt. cards were pulled separately, under the assumption that the trends would probably be different because of the different classes of customers served by the different capacity meters, and also because of the difference in costs involved.

Fig. 2, shows that although the maximum saving would have been possible by removing 5 lt. meters in their 10th month of idleness, and 10 lt. in their 12th, the difference in saving is so little that 5 lts. could very well be removed down to their sixth month, and 10 lts. to their third.

Briefly, the results of the two surveys would indicate that in times of normal increase 13 months is a fair period to allow meters to remain idle before removing.

In times of depression where accounts are being lost instead of gained, 5 lt. meters should be removed as needed down into the seventh month, and 10 lts. to the fourth.

Owing to the fact that in times of depression new money is difficult to obtain, and the loss of accounts equally difficult to predict, the relatively small savings between these months and the months of maximum saving might easily be wiped out.

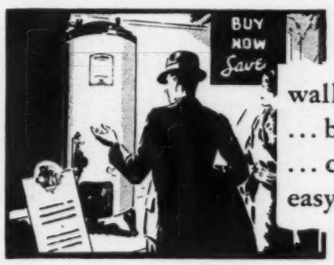
LOGICAL?

Picks up favorite newspaper ... sees big P. G. & E. sales promotional ad ... reads WHY he should buy ... sees your Tie-in ad along side ... reads WHERE to buy ... what MAKE is best ... its exclusive Advantages ... how much it COSTS ... starts thinking ...

★

goes to the office ... to the movies ... to the country ... anywhere, everywhere his eye is caught by billposters ... truck signs ... bill-stickers ... reminded constantly to Buy Now! ... See Your Dealer! ... Buy Now! ... See Your Dealer! ... can't forget ...

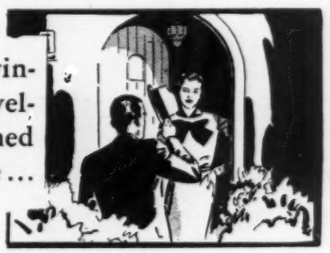
★



walks down town ... passes your store ... attracted by window ... brilliant lights ... beautiful appliances ... gleaming chromium ... colorful enamel ... desire-to-own increases ... why not? ... so easy ... reasonable prices ... attractive terms ... consults wife ...

★

wife studies newspaper ads ... notices billboards ... goes window shopping ... becomes enthused ... answers doorbell ... welcomes salesman ... finds him polite, eager to help, well informed ... hears clinching arguments ... decides to act ... re-visits store ...



★

selects model ... appliance installed ... goes to work ... proves indispensible ... wins family approval ... shown off proudly ... makes new friends ... dealer follows up sale ... gets prospects' names ... makes more sales ... invests in more Tie-ins ... Repeat!

YOU BET IT IS *It works*

P·G·and E·

★ PACIFIC GAS AND ELECTRIC COMPANY ★

Owned · Operated · Managed by Californians

The heater that smiles while it warms

FRASER

Radiant Front Console

Imagine a circulating heater with all the added advantages of a cheerful open fireplace. It is absolutely new—a revolutionary contribution to gas heating.

Manufactured by

Fraser Furnace Company
Stockton, California

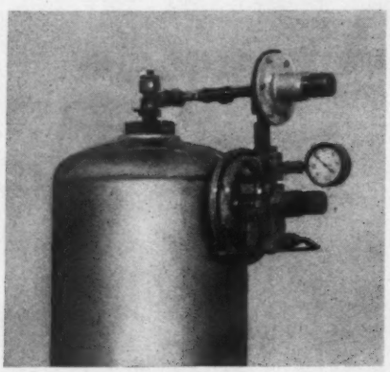
Distributed by

H. R. Basford Company
San Francisco Los Angeles

Announcing

"GASAIR"

Emergency-Repair Unit



Furnishing a Propane-Air mixture that makes burner adjustments unnecessary in change-over or emergency stand-by for either natural or manufactured gas service.

Operates on all makes of Bottled Gas.

Eliminates running a by-pass when work on service line is necessary.

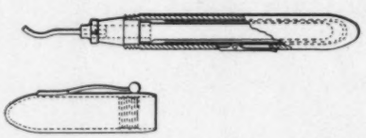
The cost of a unit is less than the cost of running a by-pass.

UTILITY DEVELOPMENT COMPANY
5815 Third Street San Francisco, Calif.

Even in normal times, seasonal activities make it inadvisable to strictly adhere to the 13 months period. For example, this company removes very few meters in September and October, because of the moving season, and very few in the first portion of November unless an early cold snap has brought about the reapplication of those consumers who use gas principally for heating.

Pocket Fount for Recorder Ink *

EVERY meterman has had the experience of arriving at a recording gauge, needing ink, with no ink available in the vicinity, and a trip back to the car or back to the shop is necessitated. It is true the ink bottle should be kept near the recorder, but it is also true that a meterman, meter foreman, or an operator, could save himself many steps if he carried a little ink with him.



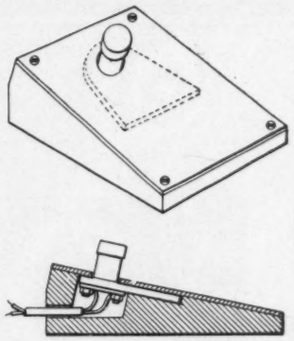
The conventional type of recorder ink bottle with dropper does not lend itself readily to convenient transportation and with this in view, the "gadget" described below was conceived.

A 10-cent store variety of self-filling fountain pen is modified to serve as an ink fount for recorder pens. The pen point and feed bar are removed and in their place is inserted a small sleeve made from bakelite or wood, and a small length of capillary copper tubing. This can be sealed in with liquid solder. The copper tube may be as long as convenient, and of proper length so that the cap will fit, as when used as a fountain pen. A small bend is put in the copper tubing for convenience, when dropping ink into recording pens. Ink is drawn in and expelled in the same manner as a self-filling fountain pen is operated.

It was found that the particular pen tried held approximately 50 drops of recorder ink, and this ink could be easily expelled one drop at a time.

Foot Switch for Drill Press*

MOST meter shops are equipped with an electric drill press of some kind, with a hand switch on the wall or on the motor, which requires hand operation. A foot control switch makes for convenience and safety, and gives the operator free use of both hands for handling his work. This is especially desirable when the drill press is used for wire brushing the insides of orifice meter bodies.



A Model T Ford starter switch of the conventional type is inserted in a block of wood as per sketch and proves to be a worthwhile "gadget" for the meter shop.

A set of circular wire brushes, mounted to round metal shafts, of proper length and diameter to fit the drill chuck, is a valuable addition to any meter shop. A set of these brushes would consist of one of proper diameter for the high and low sides of the various sizes and types of meters used. In the case of the high side of a 100-inch Westcott a round piece of wood or metal tubing properly grooved or slotted, to hold a piece of emory cloth, and of an O.D. to make a snug fit in the meter when the emory cloth is fastened around it, can also be used in the drill press for cleansing the insides of dirty meters.

*On April 26 the Southern California Meter Association featured a number of "gadgets" on its program, among them the two reproduced on this page, both of which were submitted by R. F. Angell of the Union Oil Co. The remodelled fountain pen for carrying recorder ink was selected by vote at the meeting as the winning gadget among those submitted.

Pressure Control Is S. C. M. A. Program Topic

PRESIDENT Edgar Wilde called the Southern California Meter Association to order at the Lakewood Country Club, Long Beach, Calif., on July 25 for the first meeting of the new fiscal year. Program features were sponsored by the Foxboro Co., Dudley Hill and Virgil Schultz of the Foxboro organization each contributing a paper. Mr. Hill's paper was on the subject of pressure control problems, while Mr. Schultz dealt with two distinct topics, "Design of Pressure Measuring Devices" and "A New Pressure Compensator." Each paper was accompanied by slides.

Members of the Association are urged to note the change in meeting date, the monthly meetings now being held the fourth Wednesday instead of the fourth Thursday. Any change in this arrangement will be carried on the regular monthly meeting notices.

Experienced Man Wants Position as Manager, Engineer, Superintendent

Western Gas has received an inquiry from a gas man, 45 years of age, college graduate, who desires to secure a position as local manager, engineer or superintendent with a gas property. He claims a wide experience and is willing to accept employment in any state. Further information will be given upon application to *Western Gas.*

HERE'S ONE SURE WAY GAS COMPANIES CAN *Save Money!*

Standardize on NATIONAL Scale Free Pipe for service lines! This will eliminate frequent interruptions on account of repairs and replacements, due to clogged orifices, or to pitting. The clean, smooth surfaces of this pipe have no scale to break off and start these troubles because the NATIONAL Scale Free Process (applied to butt-weld sizes ½ to 3-inch) eliminates the scale. This process was developed by National Tube Company and has made NATIONAL the outstanding pipe value for gas service. Read the 5 outstanding advantages listed to the left; they sum up the reasons why this pipe gives assurance of longer life, better service, and greater economy. For your next requirements be economical—play safe at the start—insist on NATIONAL—*The Original Scale Free Pipe.*

ADVANTAGES

1. Minimized corrosion—particularly pitting. 2. Better base for galvanizing or other protective coatings. 3. Full delivery capacity—less friction loss. 4. No damage to valve seats; no clogging of small orifices. 5. Greater strength at the weld —due to the extra rolling in the process.

All National Galvanized Pipe is given a special chromate treatment to resist discoloration and the formation of white rust. This patented process preserves that smooth glistening surface or metallic lustre which is characteristic of good galvanizing.

NATIONAL TUBE COMPANY, Pittsburgh, Pa.
Subsidiary of United States Steel Corporation

NATIONAL SCALE FREE PIPE
SPELLERIZED

National Metal Congress Convenes October 1-5 In New York City

The National Metal Congress and Exposition will convene for its 16th annual meeting, in New York City, October 1-5, 1934, under the auspices of the American Society of Metals, formerly the American Society for Steel Treating. An innovation at the 1934 convention will be a series of practical lectures on metallurgical problems, in addition to the customary presentation of technical papers recording progress in metallurgy. Among the subjects scheduled in the series of lectures will be hardening of tool steels and the melting of different types of steels. W. H. Phillips is president of the Society and W. H. Eiseman, secretary.

Parsons, Kans., to Vote on Municipal Plant

City commissioners of Parsons, Kan., have ordered a special election, early in August, on a $275,000 bond issue for construction of a municipal gas plant. The Union Public Service Co., subsidiary of the Gas Service Co. of Kansas City, Mo., now serves Parsons.

Canadian Gas Ass'n Sets 1935 Dates

The 1935 annual meeting of the Canadian Gas Association has been set for June 10 and 11, in Quebec, Canada, according to George W. Allen, secretary-treasurer of the Association.

Texas Underground Storage Experiment Successful

RECENT additional tests have established the practical usefulness of the method originally suggested in April by Frank L. Chase of Dallas, Texas, for restoring natural gas back into the ground as a means of preventing a daily wastage of one billion cubic feet of gas a day in the Texas Panhandle. Mr. Chase is vice-president of the Lone Star Gas Co. and chairman of the Natural Gas Department of the American Gas Association.

Frank Chase

The wastage of natural gas in the Panhandle field is the result of a state law, commonly called the sour gas law, which permits gasoline stripping plants to extract natural gasoline from gas and blow the residue, about 97 per cent of the heating value, into the air. Of four trillion cubic feet of gas produced, three trillions have been permitted to go to waste, according to the best estimates. To reduce this astronomical figure to an understandable basis, the wasted gas would heat Texas homes and cook Texas meals for seventy-seven years, at the present rate of consumption.

As an important step in the solution of this appalling waste, Mr. Chase suggested that the residue gas should be returned from the stripping plants back into the ground. His idea was put to prompt and successful demonstration in Wheeler County, Texas, where engineers of the Lone Star Gas Co. returned 100 million cubic feet of gas into the ground in six days without mechanical pressure. Subsequent tests added to the success of the original experiment.

Representatives of gas companies in Texas and Oklahoma, and E. L. Rawlins, chief natural gas engineer of the U. S. Bureau of Mines, met recently in Dallas to study data obtained from the gas restoration method. Mr. Rawlins will seek immediate approval of his plans for further experimentation from Bureau of Mines officials in Washington. In the tests carried on to date, gas was forced back into the ground with natural pressure of the field. Subsequent experiments will be conducted with mechanical compression of a much higher pressure.

Editor's Note: Full details on the gas wastage situation in Texas appear in *Western Gas* for April, 1934.

Natural Gas Equipment, Inc., Announces Two New Bulletins

Two new bulletins have just been published by Natural Gas Equipment, Inc., of Los Angeles and San Francisco; one dealing with N.G.E. bake oven burners and the other describing N.G.E. Venturi type burners.

In the bulletin on bake oven burners Natural Gas Equipment, Inc., announces a multi-feature burner designed for modern bakery, hotel and club installations. Instructions for installation as well as capacities, dimensions and general specifications of the burner are included in the text.

The bulletin treating the N.G.E. Venturi type burners covers all N.G.E. burners utilizing the Venturi principle of entraining a part of the air required for combustion by the pressure energy of gas issuing from an orifice into the Venturi throat of a burner.

Both bulletins may be obtained from Los Angeles or San Francisco offices of Natural Gas Equipment, Inc.

Natural Gas Service Co. Opens New Skiatook Office

W. J. McNally, formerly of Collinsville, Okla., announces the opening of a new general office in Skiatook by the Natural Gas Service Co. The new office is the home also of the Skiatook Service Co., a producing gas company, and the Sedan Gas Co. which also are under Mr. McNally's management. The Natural Gas Service Co. serves gas at Skiatook, Sperry and Vera, Okla., and the Sedan Gas Co. serves Sedan, Havana, Elgin, Niotaze and Wayside, Kan.

Phillips Installing Vacuum Line

The Phillips Petroleum Co. has under construction a 5-mile gas vacuum line on its system at Burbank, Okla. The line will be of 16-inch Naylor spiral weld pipe.

The Goodman Stopper

GOODMAN — USED SINCE 1897 — 2" HANDLE & LOCKING SLEEVE — GAS MAIN STOPPER

The Reliable Shut-off for Street Mains

Equipped with Improved Patented Locking Sleeve, which locks both handles to the pipe. Stopper cannot slip. Gas cannot pass.

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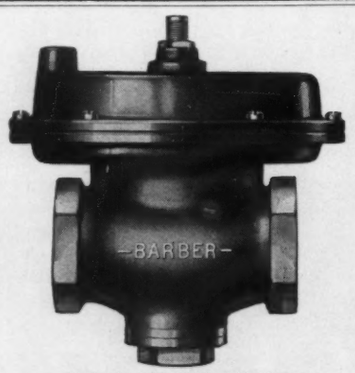
on gas bills!

That's what every one of your customers is trying to do—get gas bills down as low as possible. With a BARBER Gas Pressure Regulator on any gas appliance, gas bills will be much lower. Show one to your customers, take the orders and the profit. Write for details.



Made in ¼", ⅜", ½", ¾", 1", 1¼", 1½", and 2" sizes

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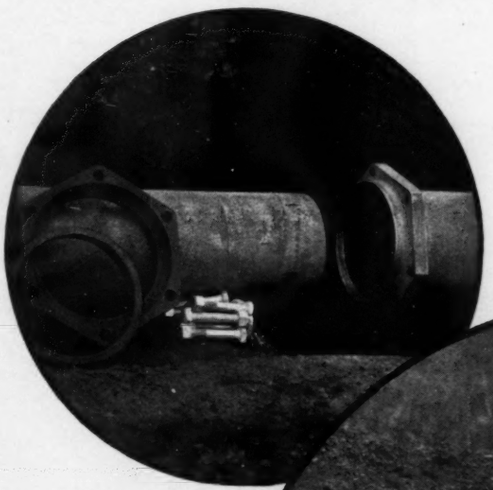
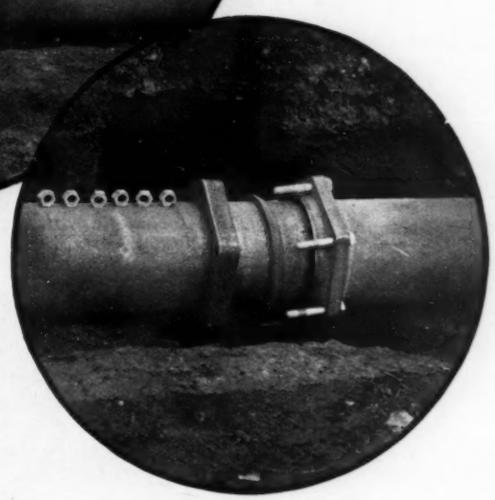
CAST IRON PIPE
with gas-tight mechanical joints



Slip the gasket and follower-ring over the spigot end and socket it — tighten a few bolts — and your gas-tight mechanical joint is assembled. One tool. Unskilled labor.



The various mechanical joints made by our members are based on the "stuffing-box" principle. All are rendering gas-tight service under high pressures in all parts of the country.

The Cast Iron Pipe Research Association, Thomas F. Wolfe, Research Engineer, 309 Peoples Gas Building, Chicago, Ill.

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General Ceramics Company, 71 West 35th Street, New York

R. J. Canniff Appointed General Sales Manager Pittsburg Water Heater Co.

The Pittsburg Water Heater Co. announces the appointment of Robert J. Canniff as general sales manager with full supervision over all sales activities of the company. Mr. Canniff entered the gas industry as sales promotion manager of the Central Hudson Gas & Electric Co. in 1920, and became active in the American Gas Association, as chairman of the Sales Stimulation Committee. The first Regional Sales Conference was originated by and held under the direction of this committee. Mr. Canniff has also served as chairman of the A.G.A. Commercial Section.

In 1926 he resigned his position with Central Hudson to become western sales manager of the Standard Gas Equipment Corp., which position he held until his present appointment.

Billings (Mont.) Gas Co. Completes Pipe Line Replacement Project

Billings (Mont.) Gas Co. has announced completion of the new 12¾-inch pipe line between Billings and Laurel, the main project in its $275,000 replacement program. The old 10-inch line is to be removed as soon as tests have been completed on the new line. Construction was in charge of I. O. Perl, superintendent of the pipe line division, and called for 2,250,000 feet of pipe, 140 tons of asphalt, 65 miles of 12-inch asbestos felt and 20,000 square feet of builders' felt wrapping.

The company's replacement program on the Billings city distribution system is reported about half completed. J. E. Moore, is manager of the company.

Commission Orders East Ohio Gas Co. Rate Reduction at Cleveland

The Ohio State Public Utilities Commission on July 11 ordered a reduction of $1,185,000 a year, and a refund of approximately $3,500,000 to the 230,000 consumers served by the East Ohio Gas Co. in Cleveland, Ohio. The Commission held the company's present rate of 64.18 cents per M c.f. excessive and set an average of 57.15 cents as a fair rate. It is not known as yet whether the company will appeal the decision.

H. M. Bradford Made Sales Supervisor For Community Natural

H. M. Bradford, former salesman at Greenville, Texas, has been made supervisor of sales in the eastern section of the Community Natural Gas Co's. territory. He has been in the company's employ for the past six years.

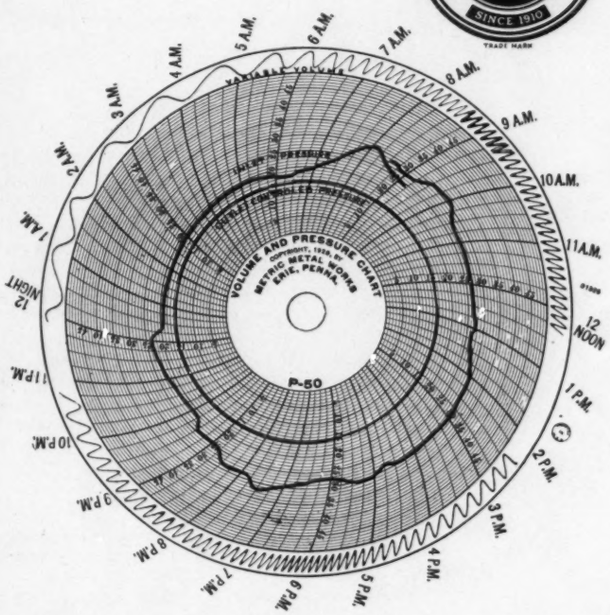
G. M. Kirkpatrick Visits Coast

G. M. Kilpatrick, sales manager for Blaw-Knox, Pittsburgh, Pa., spent part of July on the Pacific Coast, visiting gas company headquarters in Los Angeles and San Francisco.

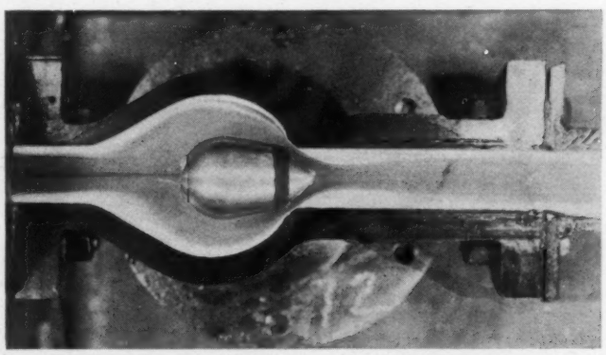
RELIANCE
demonstrates

- PERFECT CONTROL
- STREAMLINE FLOW

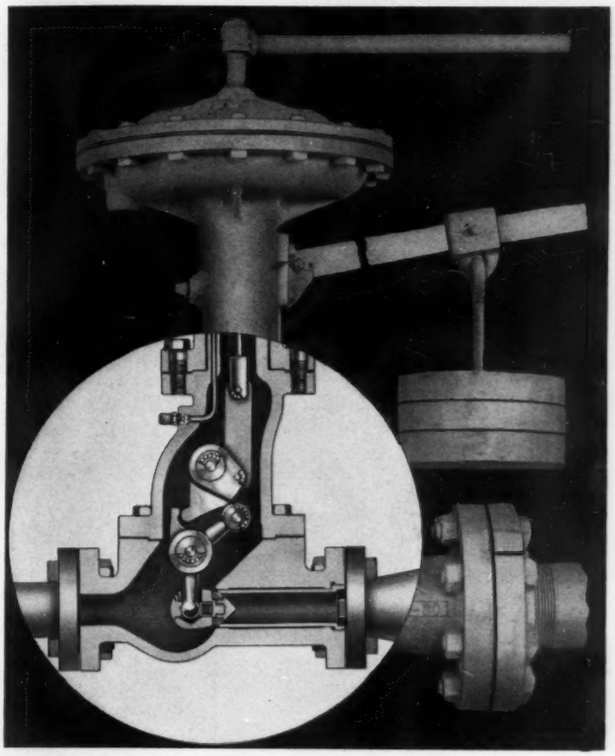
REGULATORS YOU CAN RELY ON — RELIANCE — SINCE 1910 — TRADE MARK



PERFECT CONTROL is well illustrated by this Volume and Pressure Chart.



STREAMLINE FLOW is shown in this unretouched photograph of fluid stream-line flow through orifice.



RELIANCE "TYPE P" REGULATOR, above, cutaway to show clearly its perfect yet simple operating principles.

PERFECT CONTROL

Lever arms are formed to give, through the entire arc of travel, uniform outlet pressures and power is transmitted from a conventional diaphragm chamber to a cam member, which actuates a bell crank carrying the valve. The cam is held by an eccentric cam bearing shaft which can be adjusted from the outside of the regulator, and while it is under pressure, for any adjustment that might be necessary. Roller ball bearings are used at all bearing points, insuring easy action and sensitive movement of working parts.

STREAMLINE FLOW SELF-CENTERING VALVE

A single stream-lined valve mechanism floating in the stream flow insures maximum capacity with a minimum of friction. Valve is self-centering with orifice throat, and operates on a ball socket joint that gives perfect alignment.

ELIMINATES TURBULENCE

Expanding gases and turbulence do not interfere with working parts, and scouring action on valve stems, valves, and valve seats is entirely eliminated. A removable valve seat with a long extension throat, made of stainless steel, takes the shock of the expansion and turbulence.

FREEZING ABOLISHED

Due to single valve construction, whereby expansion of gas is down stream of working mechanism, this undesirable feature is entirely eliminated.

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THE SUPERIORITY OF THIS ALUMINUM LINED PIPE OVER ALL OTHER TYPES OF COMMONLY USED GAS VENT PIPE HAS WON FOR IT

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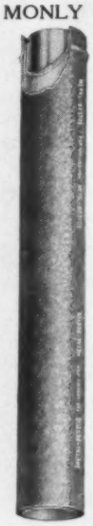

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Beverly Hills, California

Pilot Grounds for Cathodic Protection

(Continued from Page 15)

protection installations have characteristics similar to those of vertical ground rods.

The variation of resistance of a single rod conductor of various lengths, when placed at least 200 diameters from the return conductor in 1000 ohm soil, is shown in Fig. 4.

The resistance of a straight buried rod or pipe, varies very nearly inversely as its length.

The reduction of the resistance to ground with increasing diameters is shown for three different sizes in Fig. 4.

If the pipe cannot be laid in a straight line, it may be laid in two or more parallel lengths that are electrically connected together. If these pipes are separated far enough, the combined resistance will be as low as it would be for a straight pipe.

The same rules for spacing that were used for vertical rods also apply to the horizontal conductors. The effect of various separations is shown in Fig. 3.

This figure shows that if the space is limited the resistance can be reduced further by placing the pipes closer together. Each conductor is not contributing its full share in reducing the resistance of the ground connection.

The following example will show the method of designing a ground bed of horizontal conductors:

Final ground resistance to be attained ..... .02 ohm
Maximum length of pipe on site available ..... 80 feet
Average resistance of soil as determined by samples taken at pipe depth ..... 200 ohms per c.c.
Outside diameter of pipe available for ground electrode ..... 8 inches

From Fig. 4, it is found that:

80 feet of 8-inch pipe in 1000 ohms per c.c. soil will have a resistance of ..... .04 ohm

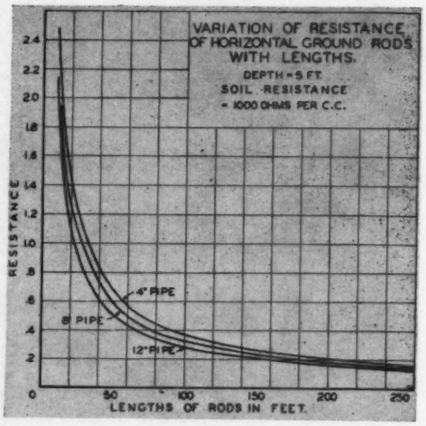

VARIATION OF RESISTANCE OF HORIZONTAL GROUND RODS WITH LENGTHS.
DEPTH - 5 FT.
SOIL RESISTANCE - 1000 OHMS PER C.C.
RESISTANCE
4" PIPE
8" PIPE
12" PIPE
LENGTHS OF RODS IN FEET.

Fig. 4.

Resistance in 200 ohms per c.c. soil
$= \frac{200}{1000} \times .4 =$ ..... .08 ohm
Final resistance of ground network
in per cent $= \frac{.02}{.08} =$ 25%

Referring to Fig. 3, it is found that this will require four 8-inch pipes spaced at 240 diameters (240 × .66 feet = 180 feet); or six 8-inch pipes spaced at 70 pipe diameters (70 × .66 feet = 47 feet).

The latter case would require less land in a direction at right angles to the pipes, but if the six pipes were distributed evenly to cover the same space occupied by the four pipes, the resistance would be reduced to 20 per cent or .016 ohm.

The exact distribution and spacing of the pipes again depends on the dimensions of the site available for the ground network and on the geologic features of the site.

Advantages of Horizontal Pipes

1. Entire length of pipe can be placed at a depth that remains moist throughout the year and it not affected by the surface soil in summer.

2. Due to the fact that the pipe is at a comparatively shallow depth, periodic examinations at several points along its length can easily be made, to determine the progress of corrosion.

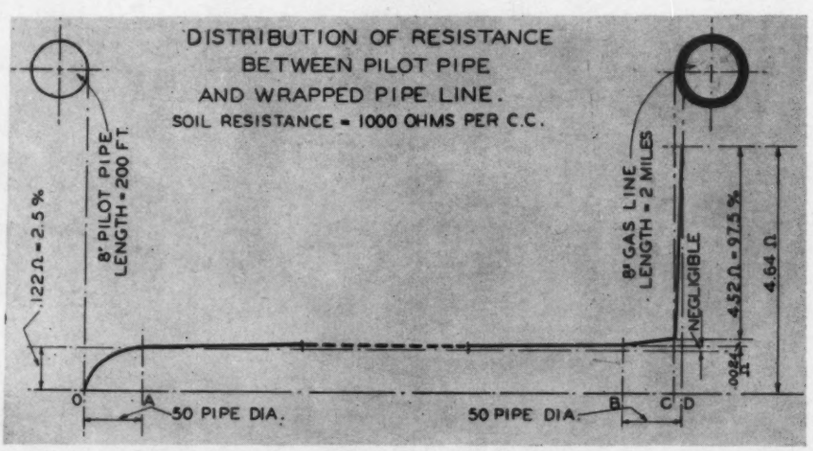
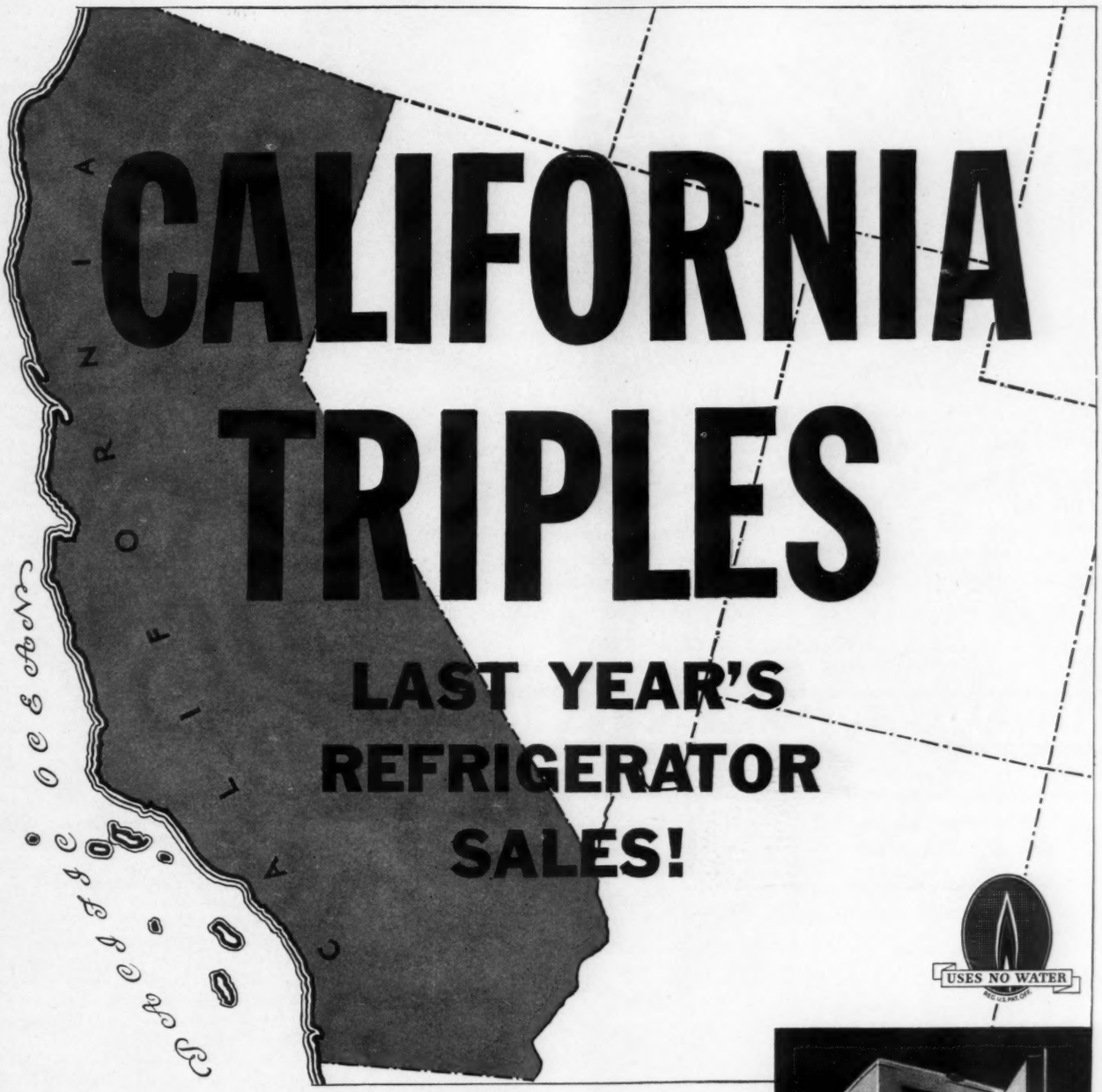


Fig. 5.



THEY do things in a *big* way in California! During the first half of this year, gas men of this sunny state pushed their Electrolux sales up 300% over sales during the same period in 1933. And they're still going strong!

The tremendous success of California, however, is not an isolated phenomenon! In almost every section of the country, Electrolux sales have shown record-breaking increases during the first seven months of this year. Today, Electrolux is the choice of more families than ever before!

And there's no reason why this buying trend to Electrolux should not continue during the coming months! This summer's extreme heat has made many more families realize strongly their need for modern refrigeration. And right now is the psychological time to bring to the attention of these prospects the superiority and economy of gas refrigeration.

It will pay *your* company—as it will pay every gas company—to maintain undiminished your efforts on Electrolux during the months ahead. Make certain that the refrigerators installed in your territory are *gas* refrigerators! For assistance in planning your fall sales and merchandising plans, write, wire or phone Electrolux Refrigerator Sales, Inc., Evansville, Indiana.

The operating costs of Blaw-Knox Gas Cleaners are negligible. They remove all entrained solid or liquid foreign material from the gas. Let our engineering department give you full details in association with your own problem. This service is rendered without obligation.

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Bulletin No. 05 gives full details.

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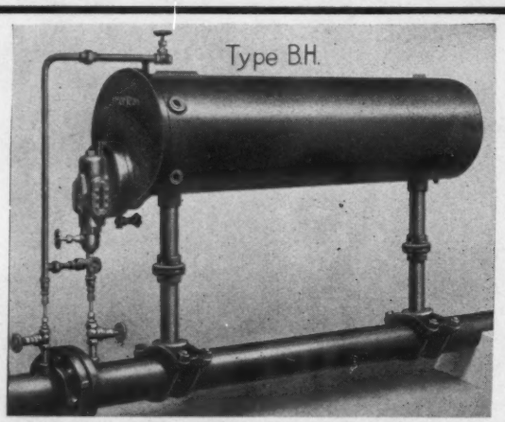


ROBERTSHAW
"Automati Cook"

You Can't Expect Robertshaw Results Unless the Robertshaw Name is on the Dial.

ROBERTSHAW THERMOSTAT CO.
Youngwood, Pa.

3. Large pipes can be used in a machine-dug trench whereas placing long pipes of large diameter may prove to be difficult.

4. Horizontal electrodes can be used in shallow soil where a hardpan or rock formation is only a short distance below the surface.

5. The pipe is placed 4 or 5 feet below the surface so that it does not interfere with the using of the ground above it for agriculture or other purposes. The consequence of this is that easements or right-of-ways for use of an electrode of this type can be obtained at a reasonable price.

6. In a rocky formation in which the driving of rods is not possible, a horizontal pipe may be laid in a trench filled with soil.

Disadvantages of Horizontal pipes

The length of the horizontal pipes required to obtain a low resistance, will not permit the use of this type of ground electrode if the available space is limited.

The resistance of all of these ground connections may be reduced by saturating the soil with tap water, or water containing salt. By means of copper sulphate, or sodium chloride used in sufficient quantity, the soil resistance can be reduced from several thousand ohms per cubic centimeter to 100 or less.

Distance between Pilot Ground Electrode and Pipe Line

The total resistance of the soil measured from a buried pipe to any point "P", increases logarithmically from O to A, as shown in Fig. 5. Taking the diameter of the pipe as a unit of measure, the rate of increase of resistance at a distance of 50 diameters is only 1 per cent of that found at the surface of the pipe. Beyond this distance, the soil resistance, due to its large cross-section, may be considered negligible. Practically all of the resistance is located within 50 diameters of the pipe. A current leaving the pipe, after having passed through this "resistance jacket" 50 pipe diameters in thickness will find itself in a soil of practically no resistance and will be free to travel in any direction without restraint. The distribution of current in a pipe line receiving current from an electrode placed at a distance of 50 diameters or more is controlled entirely by the resistance of the pipe itself and its surface insulation, as shown in a previous paper.*

The distribution of potential between a pilot ground electrode and a protected pipe line, neglecting the polarization e.m.f's, is shown in Fig. 5. The pilot pipe is 200 feet in length and has an 8-inch outside diameter. The resistance is calculated as that of a short portion of a long line.

The pipe line protected is 8-inches in diameter, 2 miles in length, and covered with a protective coating having a resistance of 100,000 ohms per square foot of surface. The soil resistance is 1000 ohms per cubic centimeter and the separation is several hundred pipe diameters.

The resistance of the soil to a point 50 pipe diameters from the pilot pipe, from O to A, is	.12 ohm
The resistance of the soil from A to B, as previously explained, is negligible	0

*Cathodic Pipe Protection, *Western Gas* for April, 1933; and Cathodic Protection of Pipe Lines from Corrosion, Pipe Line News for June, 1933.

The resistance of the soil, from B to C, around the pipe line 2 miles in length to a distance of 50 diameters = .0024 ohm which is negligible.. 0

Resistance of pipe cover, from C to D, for 2 miles of pipe at 100,000 ohms per square foot ..... 4.52 ohms

Total resistance between pipes..... 4.64 ohms

The distribution of potential between the two pipes is therefore: At pilot pipe 2.5%
In pipe line wrapping 97.5%

There being no appreciable resistance in the soil between A and C, this distance can be eliminated by reducing the distance between the pilot pipe and the pipe line to 50 pilot pipe diameters, that is, placing the point A at D. The spacing in this case would be:

$$50 \times .66 \text{ feet} = 33 \text{ feet}$$

This distance of 50 times the diameter of the pilot electrode applies to either horizontal or vertical ground conductors. In case a number of rods or pipes are used in parallel, the nearest rod or pipe, whether horizontal or vertical, should not be closer than the aforementioned minimum distance.

Appreciation of the fact that a shorter distance may be used than has generally been assumed, frequently makes it possible to place the pilot electrode on the opposite side of the road on which the main line has been placed. This makes it unnecessary to acquire additional property.

The electrodes may be placed in any position with respect to the pipe lines. They have been installed parallel to the pipe line, at right angles to it on an intersecting roadway, at an angle of 45° in a near-by slough. The only requirement to observe is that the nearest portion of the electrode must be kept at the proper distance from the pipe line.

The size of the ground rods or pipes must be such that they will contain sufficient metal to give a life of 20 to 30 years. This usually limits the selection to heavy-walled pipe.

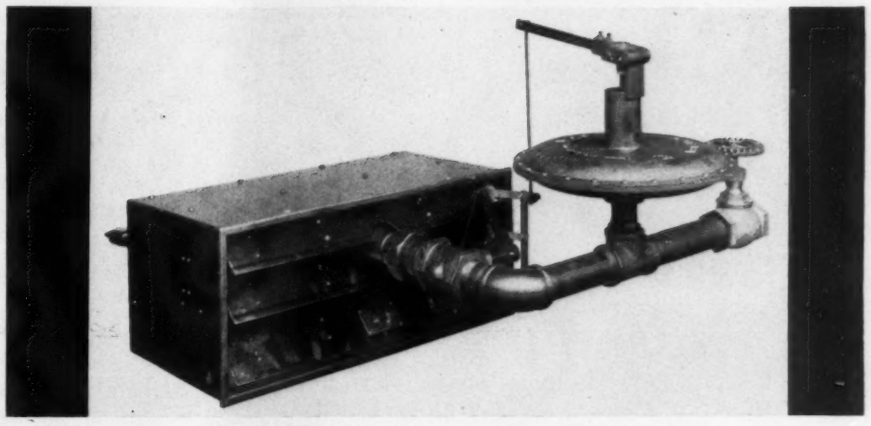
Experience with pilot pipes laid in reclaimed tide lands shows that the corrosion efficiency, with a current density at the pilot pipe surface of 100 milliamperes per square foot, is approximately 20 per cent. Instead of the usual 18 pounds of iron lost per ampere per year, only 3.5 pounds were used. Experiments seem to indicate that the losses are much higher at the start. In all of the installations made by the Bureau of Tests and Inspection of the Pacific Gas and Electric Co. in the last few years, the life of the pilot electrodes has been calculated on the basis of a loss of 5 pounds per ampere year.

The ground electrodes are inspected at intervals of two or three years by exposing them at two or three points, along their length. In this way the rate of loss can be approximately determined.

Reference: P. C. G .A. Pipe Protection Committee Report for 1933, "Ground Electrodes for Cathodic Protection Installations."

Southern Gas Line, Inc., Asks Permit

The Southern Gas Line, Inc., Monroe, La., has applied to the United States Engineer's Office, Vicksburg, Miss., for permission to lay an additional 8-inch natural gas pipe line across the Red River at Alexandria, La., to parallel two 8-inch lines laid in 1923.



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Now it is possible to combine the high efficiency of the N.G.E. Series 100 Gas Burner with the advantage of accurate and automatic control of *both air and gas.* Automatic series 100 has been developed to utilize the most favorable characteristics of both the multiple jet and venturi type burners in one unit. Tests in actual service under widely varying conditions indicate that this burner meets to an unusual degree all requirements for correct heat application and high combustion efficiencies. With the automatic control unit shown above accurate louvre openings are assured. Specify N.G.E. Series 100 Gas Burners for your next boiler installation. They embody the same rugged fool-proof construction which has characterized Wilgus-N.G.E. equipment for the past 15 years. Write for the bulletin showing the various types and sizes of N.G.E. Automatic Control Gas Burners.

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N.G.E. Liquid Level Controllers
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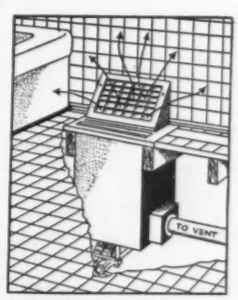
Write for literature, terms, and prices. Ask about Ward Floor Furnaces with Bilt-In Thermo-Control.



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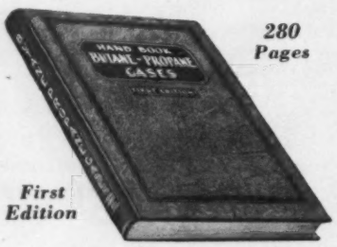

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Gas Men Meet Emergency During Chicago Fire

A recent issue of Peoples Gas Club News, house organ of the Peoples Gas Light and Coke Co., Chicago, gives details of the company's activity during the stockyard fire in May. When first news of the fire was received over the radio in the office of the South Shop of Peoples Gas Light a service man was immediately sent to the fire scene. As the spread of the blaze was reported 165 service men were mobilized and rushed to the fire area, near which base headquarters were established. Six compressors, approximately 15 trucks and many private cars of gas company employees were also pressed into service.

Larger mains and service pipes leading to the demolished buildings were capped and plugged, while other lines were cut off to isolate buildings in the danger zone.

Texas Companies Close Water Heater Sales Race

May 31 closed the water heater sales race among divisions of the Community Natural Gas Co., Texas Cities Gas Co., and the Stamford and Western Gas Co., Dallas, Texas, with a total of 535 installations reported.

Six cash prizes were offered, on a meter basis, with an incentive of a 50 per cent increase in each prize should 500 installations be made by the participating companies. Prize winners in the order of their standing were: Group 1—Greenville, Sweetwater, Temple; Group 2—Handley, Vernon, Brownwood.

C. L. Trevitt is new business manager for the companies, all on the Lone Star system.

Arthur H. Carroll, Peoples Storekeeper, Dies

Arthur H. Carroll, assistant general storekeeper of the Peoples Gas Light and Coke Co., Chicago, Ill., passed away early in June, after more than 36 years of service with the company.

Mr. Carroll served as fitter's helper, clerk and shop foreman for the company until 1906 when he was made general foreman. In 1914 he was appointed assistant superintendent of the arc lamp trimming department, and in 1919 became assistant general storekeeper.

Texas Gas Companies Under New Railroad Commission Ruling

Gas companies have been prohibited from raising rates in Texas communities of 2,000 population or less, without first applying for the increase and showing it to be fair and reasonable, according to a temporary order of the Texas Railroad Commission.

New Mains in Vinvale District

Southern California Gas Co. is completing the laying of 1½ miles of 2-inch main in the Vinvale district, east of Bell, Calif., adding 60 customers to its service in that area.

Pipeliners active again—on 20-inch Dresser-coupled lateral for New York State Natural Gas Co.

N. Y. State Natural Gas Co. Completes Auburn Line

NEW YORK State Natural Gas Co. has completed a 21.7 mile 10-inch lateral off the 20-inch Syracuse line, south of Onandago, leading into Auburn, New York.

Operations started on April 1, 1934, and excellent time was made in spite of swamps, quicksand and water encountered during construction. The line was laid under contract by Rich and Co. of Bradford, Pa., with Adam Schreiber of New York State Natural Gas Co. supervising.

This new line will carry natural gas from the Tioga and Hebron fields to the rich industrial city of Auburn, New York.

Jones & Laughlin Seamless Steel pipe, 10¾ inch, weighing 28.035 pounds to the foot, and in 40 foot lengths was used.

Dresser couplings were used throughout, the laying crew reaching high point of performance in laying and jointing 116 joints per day.

The line was built to withstand pressures of 800 pounds per square inch, although operating pressures will be much lower.

B. C. Electric to Add 10 Miles of Lateral to New Pipe Lines

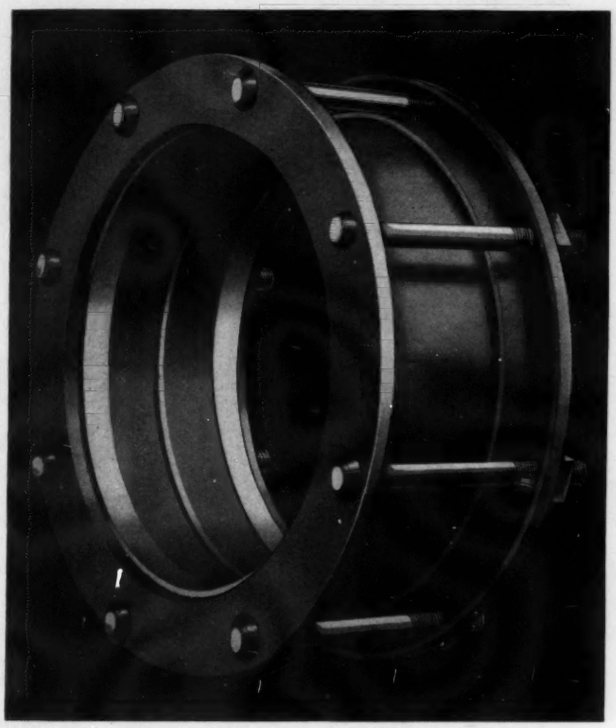
British Electric Railway Co., Vancouver, B. C., is planning to add 10 more miles of lateral line in Oak Bay, Esquimalt, and Saanich, to the 30 miles of high pressure pipe line on which the company began construction in 1933.

It is estimated that approximately 1000 additional consumers will be added within the next three months.

Hickok Oil Corp. to Serve Cisco

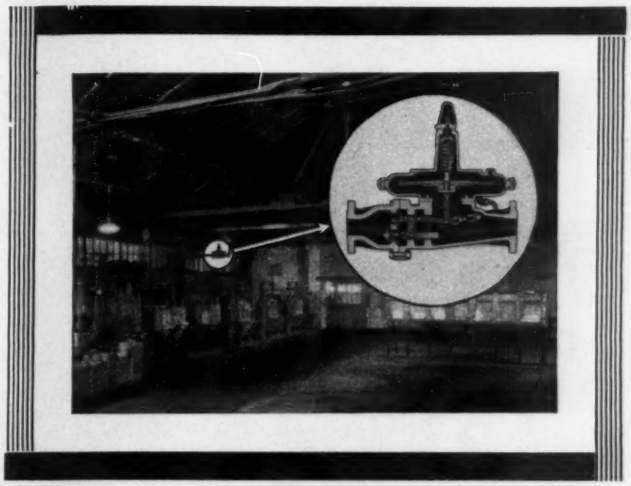
Hickok Oil Corp., Toledo, Ohio, has secured a franchise to serve natural gas in Cisco, Texas. The company is planning to build a line from its properties near Eastland, Texas, to Cisco.

DAYTON
ALL-STEEL
PIPE COUPLINGS



For nearly a third of a century, the service rendered to the gas industry by Dayton Couplings has been constant and unfailing. In use all these years, they have proven themselves for convenience and rapidity in pipe line construction or repair, for efficiency and dependability in service, and for economy in both installation and upkeep.

THE NATIONAL-SUPERIOR CO
DAYTON PIPE COUPLING DIV.
DAYTON, OHIO



Actual photograph of REYNOLDS Double Balanced Valve Toggle Type installation in industrial plant. Inset shows enlarged cross-sectional view of unit, with placement of unit also indicated.

GREATER CAPACITY
INCREASED RANGE
QUICKER RESPONSE

■ REYNOLDS Toggle Type Regulators for industrial Gas Control, proved by performance in actual operation, guarantee smooth, constant outlet pressure and volume even though inlet pressure and volume are decidedly jumpy. These Regulators mark an improvement in industrial gas regulation. Some of their outstanding features are: removable valve pocket and orifices; side hand holes; stream-lining that directs the flow of gas, increasing capacity and range;* pressure reduction from pounds to pounds, and pounds to inches W. C.; single or double valve construction; spring or dead weight type adjustment and equipped with or without pilot control.

*Body of Regulator is so machined that a pounds to pounds diaphragm casing, or a pounds to inches W. C., diaphragm casing may be used or interchanged. Also equipped with removable inlet spool with orifices which permits installation of various sizes of orifices while regulator is in pipe line.

Reynolds Branch Offices:
421 Dwight Bldg.
Kansas City, Missouri
2nd Unit, Sante Fe Bldg.
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Representatives:
Eastern Appliance Co.
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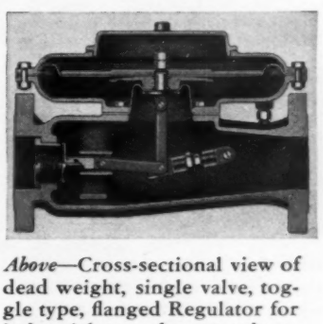
Los Angeles, Calif.



Above—Cross-sectional view of dead weight, single valve, toggle type, flanged Regulator for industrial use, for pounds to pounds, or pounds to inches W. C.

REYNOLDS GAS REGULATOR CO.
ANDERSON, INDIANA, U. S. A.

GAS CONTROL SINCE 1892

NEW *Sales Literature*

Now Available!

Pacific
GAS HEATING HEADQUARTERS

Our Line for 1934!

- FLOOR FURNACES
- CABINET HEATERS
- WALL HEATERS
- GAS STEAM RADIATORS
- RADIANT HEATERS
- WATER HEATERS
- GRAVITY FURNACES
- FORCED AIR FURNACES
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The Outstanding Gas Appliance Line of the Pacific Coast. Write for complete information on any or all items . . .

Pacific Gas Radiator Co.
Main Office and Factory
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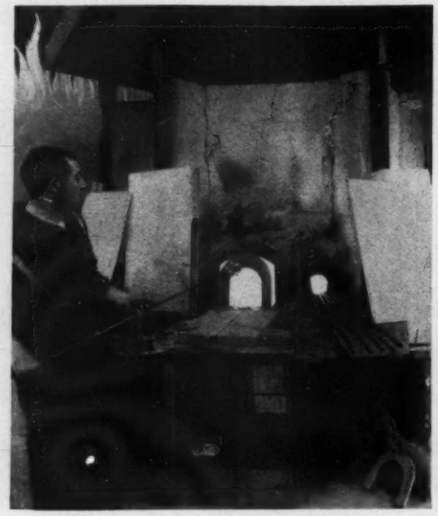
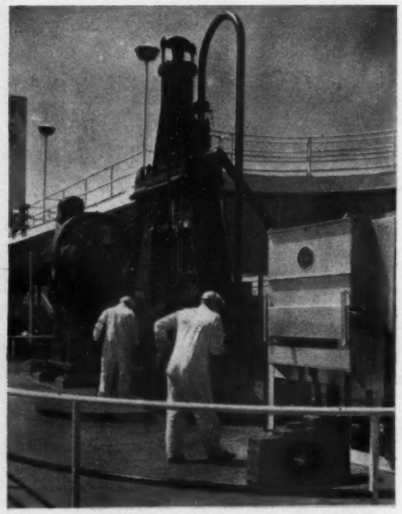
Oldest and Largest Manufacturer of Gas Heating Appliances in the West



Gas serves Venetian "Glass Master" at Venice-Murano factory exhibit, 1934 World's Fair.



A forced draft gas furnace is an essential part of Chrysler Motors exhibit.

Fair-Goers See Gas at Work for Industry

GAS from the mains of the Peoples Gas Light and Coke Co. is performing new marvels for the benefit of crowds at the 1934 World's Fair. Through the courtesy of Winfield Foster of the People's company the following information on two of these gas applications is presented.

Venetian Glass-making

Glass-making traditions that were five centuries in forming have been broken at the 1934 Fair, for the three "glass masters" working at the exhibit of the Venice-Murano factory now recognize that "You Can Do It Better With Gas."

Since the 15th century, the glass makers of Venice have been sending their two-masted sailing vessels across the Adriatic Sea to Dalmatia, to bring back dried beech wood for the glass furnaces. Upon its arrival in Venice, this dry wood was—and still is—baked in an oven for two days to remove the last traces of moisture. Only then was it suitable for firing the furnaces, for moisture is the enemy of clear glass.

When Cavaliere Celso Pier Baccovich of the Venice and Murano glass factory came to Chicago to arrange for the exhibit, he learned with dismay that the rules of A Century of Progress Exposition forbade the use of any solid, smoke-producing fuel. In desperation, he was about to abandon plans for exhibiting, until one of the engineers from the industrial department of The Peoples Gas Light and Coke Co. convinced him that gas would do the job.

Now gas is doing the job better than the Venetian glass makers have ever seen it done before. Gas furnaces provide a more even temperature, contributing to the exactness of fashioning the glass.

What is more important, the use of gas enables the glass makers to heat their furnaces to a much higher temperature—1,840 degrees Fahrenheit instead of 1,440 degrees. Not only does this greater heat make the glass clearer, by burning out impurities, but it enables the use of pigments which would not work properly at lower temperatures.

This ability to use new colors and to make a clearer glass opens new horizons to this 500-year-old industry. The three old-world artisans working on the grounds of the Chicago World's Fair can actually make better Venetian glass than their comrades at the Murano factory in Venice.

Gas Furnace at Chrysler Exhibit

A forced draft gas furnace plays an important part in one of the most popular features of the Chrysler Motors Exhibit.

The feature consists of three units—the gas furnace, which heats billets of special alloy steel to a temperature of 2210° F., the temperature being governed by an automatic control mechanism; the 4,000-pound steam drop forge hammer, which in action exerts a force of 15,000 tons on the red-hot billets, shaping them in four operations; and the trimming press, where the excess metal is scaled off the forging while it is still hot.

The earth-shaking impact of the great hammer draws the crowds at the Exposition, and the spectacle of somebody working keeps them watching. They see one of the operators reach into the white-hot interior of the furnace with a long pair of tongs, and pull out a glowing steel billet, 6x3x1½ inches. Moving over to the steam hammer, he puts one end of the billet in a groove, and turns it under the hammer blows until it is rounded and tapered.

The operator then "upsets" it—thrusts the tapered end into a carefully sized hole in the anvil block, and brings the hammer down on the projecting portion, which is forced into shape between two dies, one in the anvil and one in the hammer. A further shaping follows, after which the second operator takes the forging, which a few seconds ago was a brick-shaped billet of steel, and now is a complete steering knuckle, and places it in the trimming press, where a giant punch removes the "flash," or excess steel, leaving a finished knuckle.

NO-OX-ID
IRON-OX-RUST
TRADE MARK
The Original Rust Preventive

Reconditioning Lines and Holders

NO-OX-ID is in extensive use this summer for reconditioning gas lines and gas holders.

Combined in favor of the choice of NO-OX-ID are ease of application, extremely long life, complete reliability and low cost of the material itself.

Inquiries invited.

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MODERN HORIZONTAL BORING MACHINE

For Underground Installation of Pipe and Conduits. Avoids damage to costly Pavements and saves time. Send for Bulletin.

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343 Sansome Street • San Francisco, California

"BLUE BOOK"
Personnel Directory of the Gas Industry

1934 EDITION

This directory gives the personnel of gas utility district offices as well as headquarter companies, arranged by states and including distributing companies, pipe line companies, producing companies and holding companies. Each distributing company lists the kind of gas served — pressure—B.t.u. content—number of meters—and indicates whether or not each company merchandises.

Correct as of January 1, 1934, it is the most complete and up-to-date directory available—includes the entire United States.

176 pages
Published in convenient Pocket Size! 5 x 7 in.
1-10 copies $2.50 ea. 10-20 copies $2.00 ea.
20 or more $1.50 ea.

MAIL COUPON TODAY!

WESTERN GAS, "Publishers",
810 South Spring Street,
Los Angeles, California.

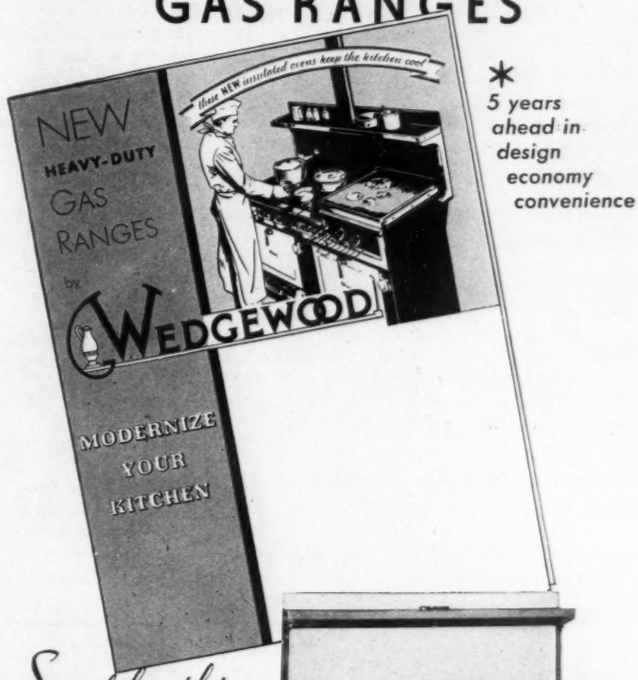
Date.....

Please send me.....copies of the "Blue Bock" Personnel Directory, 1934 Edition, of the Gas Industry at $.....per copy, for which I enclose remittance of $.....

Company name.....

Address.....

WEDGEWOOD
the MODERN *type* HEAVY DUTY GAS RANGES



* *5 years ahead in design economy convenience*

Send for this **NEW BULLETIN**

Just off the press! Shows the new line of Wedgewood *Heavy-Duty* Gas Ranges complete, as well as Heavy-Duty Plates, Griddles, etc. Send the coupon for your copy!

There is no finer or more complete line of *Heavy-Duty* Gas Ranges in America than the *Modern* 1934 Wedgewoods. It includes a type and style for every cooking need. Four distinct finishes for each model. Temperature controlled roasting or baking. Oven sides have 3½" of rock-wool insulation for economy and coolness. A full score of *New* features! Send the coupon for complete information.

JAMES GRAHAM MANUFACTURING CO.
San Francisco, Newark, Los Angeles, California
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Send* COUPON *for NEW BULLETIN

JAMES GRAHAM MFG. CO.,
695 Bryant Street, San Francisco, Calif.

Without obligation, send your New Heavy-Duty Gas Range Bulletin to:
NAME.....
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Natural Gas Approved for Omaha Distribution

CONTRACT proposed by the Northern Gas & Pipe Line Co., Omaha, Neb., to furnish natural gas to the Metropolitan Utilities District, to replace oil in the production of manufactured gas, was approved by the directors of the District in June.

Under the terms of the contract, the Northern Gas and Pipe Line Co. agreed to furnish natural gas to the Metropolitan Utilities District for an introductory period of six months at 16 cents per M c.f. During the trial year following, the price of gas would be from 25 to 30 cents per M c.f., depending upon the maximum demand.

A saving of $100,000 has been guaranteed to the Metropolitan Utilities District by Northern Gas & Pipe Line Co., and the latter has also agreed to bear the expense of change-over adjustments on appliances, up to the amount of $20,000, for the 18-months trial period.

Use of natural gas by the Metroplitan Utilities District plant is to start in approximately 60 days.

According to T. A. Leisen, manager of the District, cost of laying a pipe line to the plant and installing a meter station will amount to about $42,500. Survey of the route of the 8-inch pipe line joining the Omaha Municipal Plant and the Northern Natural Gas Pipe Line Co.'s system and other preliminary work has been completed.

Goodnight Transferred to Corsicana Office of Municipal Gas Co.

G. M. Goodnight, foreman for the Municipal Gas Co. at McKinney, Texas, for the past 11 years, has been transferred to the Corsicana office of the company, according to H. T. McLaughlin, general superintendent. R. E. McKinney, formerly of Sherman, Texas, succeeds Mr. Goodnight at McKinney.

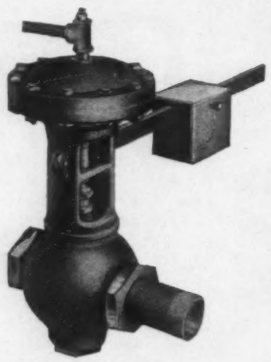
Automatic Prod. Co. Develops New Control

The automatic Products Co., Milwaukee, Wis., has developed a new product called the E-Z Lite gas water heater control. The new product is fully described in the company's Bulletin No. A-30, which may be had upon request. The control is manually operated and furnished with an automatic shut-off.

E. R. Hughes Chairman Oklahoma Corporation Commission

E. R. Hughes was elected chairman of the Oklahoma Corporation Commission early in July. Reford Bond has been made a member of the Commission upon the resignation of Paul A. Walker, who has accepted membership on the Federal Communications Commission at Washington, D. C.

Control of Compressor Discharge is Perfect



Throttling Regulator

DISCHARGE pressure can not rise above the point for which the mechanism is set, if you use the C-F Throttling Regulator. When pressure tends to rise, suction is immediately throttled. Action is prompt, positive, precise, unfailing. Discharge control is definitely accomplished. The C-F Throttling Regulator is one of 40 special types in the C-F line, covering all requirements of pressure control in the gas industry. Complete Catalog mailed on request.

CF

The Chaplin-Fulton Manufacturing Co.

28-40 Penn Avenue **Pittsburgh, Pa.**

L. S. Hamaker to Berger Mfg. Co.; S. A. Knisely in Republic Post

Lawrence S. Hamaker, sales promotion manager of the Republic Steel Corp., Youngstown, Ohio, has been promoted to the post of vice-president and general manager of the Berger Manufacturing Co., Canton, Ohio, a Republic subsidiary.

L. S. Hamaker

Mr. Hamaker succeeds Joseph B. Montgomery, Jr., who has resigned. He is a native of Canton, and began his industrial career in 1919 in the sales department of the Berger Co., transferring to the advertising department in 1923. In 1925 he was appointed advertising manager of the United Alloy Steel Co., and upon the merger of that company with Central Alloy Steel Co. of Massillon, became advertising director of the new corporation. With the formation of Republic Steel Corp. in 1930, he was made advertising manager and sales promotion director.

S. A. Knisely has been appointed to succeed Mr. Hamaker as advertising and sales promotion manager of the Republic Steel Corp.

Peoples Gas Company, Inc., To Serve Ferguson, Kentucky

The Peoples Gas Co. of Kentucky, Inc., Lexington, Ky., has been granted a franchise to serve natural gas to Ferguson, Ky. Terms of the franchise require the company to complete the laying of mains in the business section of Ferguson by October 1, 1934. Work is to begin immediately. The transmission system of the company at present extends to the city limits of Ferguson through its district office at Somerset. W. P. Simmons is manager for the company at Somerset. Peoples Gas Co. of Kentucky, Inc., also maintains a district office at Corbin, Ky., serving 1500 meters in Corbin, Barbourville, Burning Springs, and Manchester.

Unique Gas Application Being Tried by State College

Gas-operated hotbeds for flowers and vegetables are being tried out by the Pennsylvania State College. Under a plan devised by the Central Pennsylvania Gas Co., water is heated in specially designed gas-fired boilers and circulated through the hotbeds in pipes laid about 12 inches below the surface of the soil. Thermostatic controls make it easy to obtain and maintain temperatures necessary for rapid growth of plants.

Canton, Miss., Gets $158,000 Loan for Distribution System

A loan amounting to $158,000 to Canton, Miss., has been approved by the Public Works Administration to purchase a gas well near Jackson, Miss., and to construct a pipe line to Canton, where a distribution system is to be built.

Mrs. Modern . . . AND

NATIONAL ADVERTISING

● Mrs. Modern reads national advertising with her *mind open* and her *guard down*, realizing that the most fruitful place to find new ideas and modern trends is in the advertising columns of the national magazines.

The result is that she has her impressions formed of a product before she goes into the store to look at it. In many cases this impression is so strongly favorable that little or no selling is required by the retailer.

That this is true in the case of Magic Chef national advertising is proved by many records in our files. We have reports from Magic Chef dealers all over the country of gas range sales made directly as the result of national magazine advertising...

For 15 years American Stove Company through national advertising has met the eye of Mrs. Modern with its message of advanced cooking methods and its appeal for better appreciation of the advantages of cooking with gas. That she has accepted the message with confidence and approval is no less a tribute to her intelligence than a test of the overwhelming power of uninterrupted national advertising for half a generation.

This national advertising not only has helped or directly made sales year after year during this period for the benefit of the retailer, but in its influence toward protecting the cooking load, it has immeasurably benefited the whole industry.

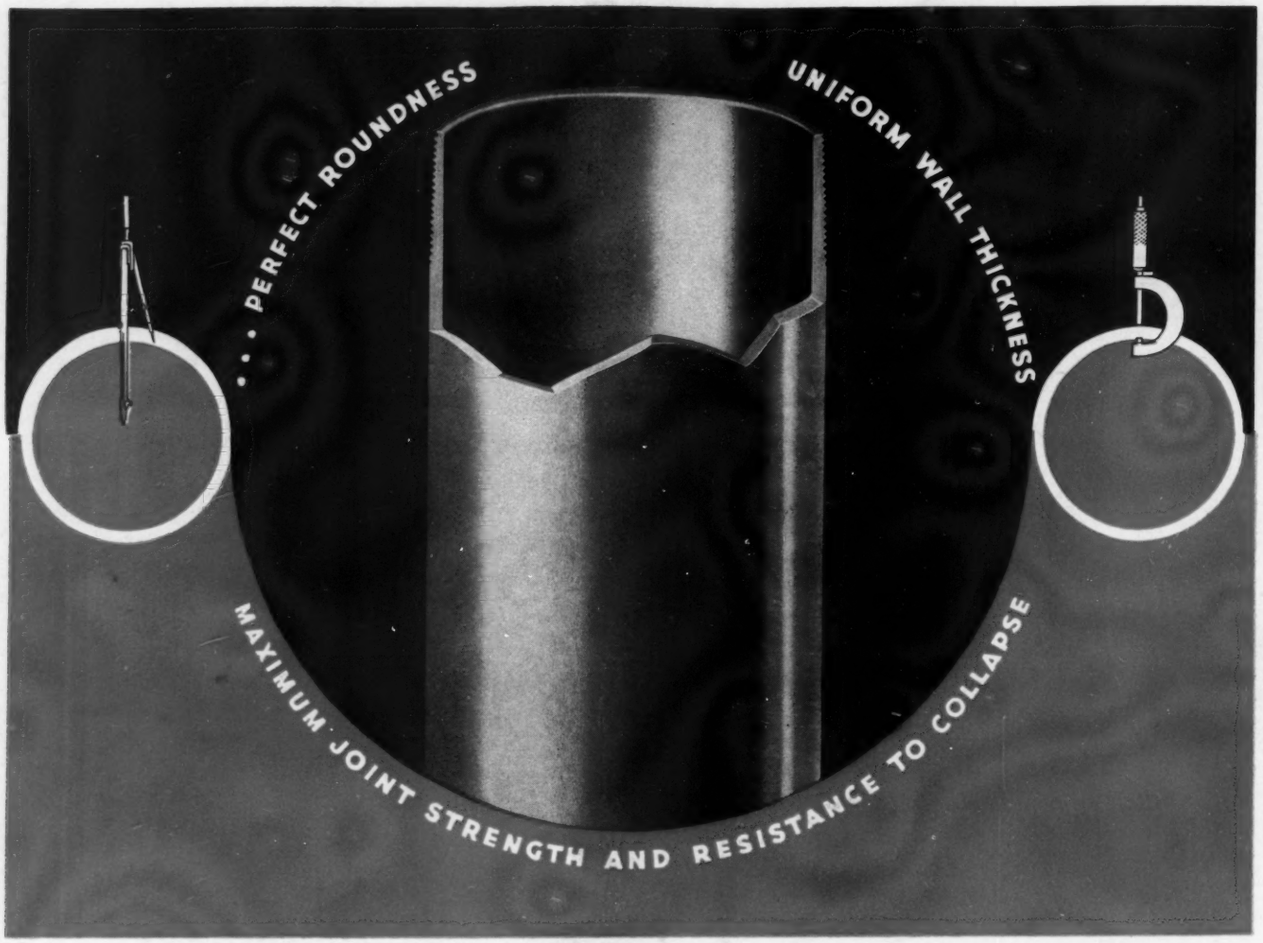
If you haven't seen the Magic Chef Portfolio for Spring, write for a copy.

(Look for this Trade Mark)
Magic Chef
AMERICAN STOVE COMPANY

AMERICAN STOVE COMPANY

WORLD'S LARGEST MANUFACTURER OF GAS RANGES

BOSTON • NEW YORK • ATLANTA • CLEVELAND • CHICAGO • PHILADELPHIA • ST. LOUIS • SAN FRANCISCO • LOS ANGELES • SEATTLE



Casing collapse, and joint failure in both casing and tubing, cost the oil industry huge sums of money annually. To cut down the loss, Republic offers a better casing and tubing—Republic Electric Weld—made by a process that insures maximum joint strength and increased resistance to collapse.

Aside from the physical properties of the metal itself, the two most important factors in reducing failures in casing and tubing are roundness and uniform wall thickness—both serving to increase resistance to collapse and insuring a uniform amount of metal under the root of every thread.

Republic Electric Weld Casing and Tubing are made from flat-rolled steel, uniform in section and grain structure. This flat steel is cold-formed to shape and then welded by Republic's modern process employing electrical resistance. By no other commercial method can casing and tubing be produced so nearly perfectly round and so uniform in wall thickness.

Republic Electric Weld Casing and Tubing are as dependable as skilled metallurgists and advanced mill practice can make them. Try them in your next well. The reports from your men in the field, during and after installation, will confirm your judgement.

REPUBLIC
ELECTRIC WELD
CASING • TUBING

REPUBLIC STEEL CORPORATION
GENERAL OFFICES YOUNGSTOWN, OHIO